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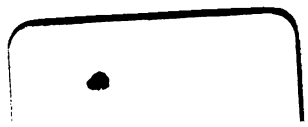

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TO THE

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CONGRESS, } HOUSE OF REPRESENTATIVES. { Ex. Doc.
Session. } { No. 268.

REPORT

OF THE

[RECTOR OF THE MINT

UPON THE

PRODUCTION

OF THE

RECIOUS METALS IN THE UNITED STATES

DURING THE

CALENDAR YEAR 1884.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1885.

TREASURY DEPARTMENT,
OFFICE OF THE SECRETARY,
Washington, D. C., February 28, 1885.

SIR: I have the honor to transmit herewith the report of the Director of the Mint upon the statistics of the production of the precious metals in the United States for the calendar year 1884.

Very respectfully,

H. MCCULLOCH,
Secretary.

Hon. J. G. CARLISLE,
Speaker of the House of Representatives.

LETTER OF TRANSMITTAL.

TREASURY DEPARTMENT,
BUREAU OF THE MINT,
Washington, D. C. February 28, 1885.

SIR: I have the honor to submit herewith the statistics collected, and my report and conclusions thereon, in respect to the production of the precious metals in the United States during the calendar year 1884.

While it might have sufficed to have published merely the results of these investigations embodied in the estimates of the total product of gold and silver during the year, it seemed desirable to trace the bullion known to have been converted into coin or manufactured into bars and exported or used in the arts back to the district or mining region from which it was derived.

This work necessitated the accumulation of statistics as full as possible of the treatment, movement, and final disposition of the bullion from its extraction from the earth in the form of ore or native metal to its delivery to the Government for coinage, or to private parties for export or other use. Supplementing this with direct information as to the actual yield of the most important mines, and with careful and generally reliable reports from correspondents and mint officers in regard to the condition and progress during the year of mining for the precious metals in the principal localities, States, and Territories producing gold and silver, it is believed that sufficient data has been obtained to justify an estimation of the yield of the various counties as well as of the States and Territories.

It would be a gratification to me to publish all the detailed information obtained in regard to the actual product of individual mines, so that the accuracy of my conclusions could be tested by the data upon which they are based. But most of these facts were confidentially disclosed, and not to be made public except with express permission.

I am again under obligations to the officers and gentlemen in the mint service designated to assist in this statistical work, and to mine owners, to bankers and dealers in bullion, agents, managers, and other officers of mining, express, and railroad companies, as well as to those engaged in smelting and refining bullion, for their ready co-operation and valuable statistics, without which I should have been unable to have determined with any degree of confidence the approximate yield of the different counties and mining camps of the several States and Territories. I have as far as practicable, in the appropriate place, when their statements or communications are used or embodied in the report, given proper credit.

The collection of statistics in regard to the gold and silver mines of the South Atlantic States was given in charge to Prof. George B. Hanna, assistant United States assayer, at Charlotte, N. C.; and the statistics of the production of Colorado, Montana, and Idaho, to the officers in

charge of the United States assay offices located in each. The superintendent of the mint at San Francisco was directed to procure information and report upon the production of the States and Territories of the Pacific coast, except as to Alaska and Nevada, the latter being placed in charge of the superintendent of the mint at Carson. These officers, with the co-operation of their clerks and assistants, have very satisfactorily performed the work assigned them, and have furnished valuable information and detailed reviews of mines and localities, which have formed, with other data, the basis of the final revised estimates of local production. Special contributions and descriptions of mining regions, for which due credit is given, have been received from mining experts and correspondents and incorporated with other material in the body of the report, or presented in separate articles.

In the preparation of this report it has been found necessary to revise, condense, and modify the material received, and often to omit portions of the communications and detailed reviews, in order to reduce the size of the report; but statistical matter and estimates of actual production have been, as far as possible, retained, even when others considered more accurate have been adopted or prepared from fuller data in my office.

Very respectfully,

HORATIO C. BUCRHARD,
Director.

Hon. HUGH MCCULLOCH,
Secretary of the Treasury.

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PART I.

PRODUCTION OF STATES AND TERRITORIES.

PRODUCTION OF STATES AND TERRITORIES.

The amount of gold and silver obtained from the mines of the United States during the calendar year 1884 appears to have been increased over the yield of the previous year in gold about $800,000, and in silver, computed at the silver dollar coinage rate, $2,600,000.

In making this estimation the same methods for determining the aggregate production of the country have been employed as heretofore adopted. The returns and information as to the amount of domestic bullion received at the mints and assay offices, exported to foreign countries, produced by the various smelters and refineries, transported by railroad and express companies, handled by bankers and dealers and reported to have been yielded by individual mines, have been compared with each other and with the estimates of the production of the several States and Territories submitted to me by experts and officials who have assisted in procuring material for this report.

As depositors of bullion at the mints and assay offices are promptly paid in nearly every case the value of their bullion on the succeeding day, almost the entire gold product of the country, except native gold and bars from private refineries used in the arts, is directly or indirectly sent to the mints and assay offices, where an accurate record is made of its character and description, which, as well as the locality from whence derived, except as to bars from some of the large refineries, are in most cases apparent to the weigh clerks upon inspection or easily ascertained by inquiry of the depositor or knowledge of his business.

From these records monthly reports are forwarded to my office, which cannot overestimate or understate the value of such bullion without showing discrepancies readily discovered and corrected between these statements and the quarterly accounts rendered by the officers, which also give the value and the amount paid for such bullion. The erroneous designation of foreign bullion as domestic rarely happens, except where refined bullion received from private refineries consists of gold bars which, although made up in part from foreign bullion, are recorded as domestic bullion. But the statements kindly furnished me by these refineries show the amount of such bullion, and this amount is deducted, as heretofore, from the reported receipts of domestic gold at the mints and assay offices, or is offset against undeposited and unrefined gold production used in the arts, ornamentation, &c. Indeed it might be claimed that some of the gold deposits reported as foreign bullion are domestic, and that an addition should be made to the estimated production on this account; for the amount of foreign gold bullion reported as deposited at the mints and assay offices annually exceeds, by several hundred thousand dollars, the imports of such foreign bullion entered at the custom-house. But this excess probably arises from the receipt of bullion brought from Nova Scotia and Mexico across the border without being entered in the custom-house returns.

The total deposits of gold and silver and purchases of silver bullion

during the year at the institutions under my charge, exclusive of redeposits amounted to $50,519,886 gold; silver, $36,671,088. Of the gold $266,877 was of United States coin; $6,328,922 foreign coin; $11,217,309 foreign bullion; $1,899,577 jewelry, plate, &c., and $30,807,200 was of domestic production.

The custom-house returns report the export of $115,963 of domestic gold bullion, exclusive of $22,950,289 United States mint or assay office gold bars.

It might be proper to add to the deposits of domestic bullion this sum, $115,963, and the value of the gold, some $600,000, contained in the silver bullion exported, and also the amount of undeposited gold used in the arts and ornamentation, which, in the form of nuggets, native grains, &c., as stated in my last report, appears from responses to my inquiries to have been for that year over $700,000, and in the form of bars from private refineries at least $200,000, for the excess of the production of one refinery on the Pacific coast over its deposits at the mint and the export of its gold bars during that year was $130,000. These amounts added to the gold deposits would increase the production of domestic gold not less than $1,500,000. But of foreign gold bullion received at San Francisco from British Columbia and the northern States of Mexico, amounting to about $1,100,000, only $400,000 was deposited at the San Francisco mint as forein bullion, and the remainder, as shown by the statement of private refineries, was refined before its deposit at the mint, and was included in the returns from that institution of refined gold of domestic production.

Deducting this would still leave over $700,000 to add to the deposits of domestic bullion. To estimate, therefore, the gold production of the mines of the United States in 1884 at the amount reported as deposited from them at the mints and assay offices is not in excess, and is probably an underestimate, of the actual production.

Of the $36,671,088 total deposits, exclusive of redeposits, of silver bullion at the mints and assay offices during the year, $32,305,036 was silver of domestic production, $415,620 United States coin, $2,296,317 foreign bullion, $1,246,773 foreign coin, and $407,339 jewelry, plate, &c.

The total exports of silver bullion during the calendar year 1884, at all the ports of the United States, including $87,370 of foreign bullion, were $17,914,697. Of this $2,148,578 were reported to consist of United States mint or assay office bars, and about $700,000 was Hawaiian coin manufactured from domestic silver deposited at the San Francisco mint during the calendar year 1884, making the total export of silver bullion, other than such bars and coin, about $15,000,000.

The imports of silver bullion were reported at $3,256,938, and the deposits of foreign bullion at the mints and assay offices $2,296,317. This leaves $960,621, which was probably exported but not distinguished from domestic bullion in the custom returns of exports. Deducting this sum from the latter, the remainder, about $14,000,000, is the probable total net export of domestic bullion which had not been deposited at the mints and assay offices. This estimation must, however, be increased by the difference between the commercial price of the silver (the exporter's valuation) and the coining rate in standard dollars (the unit of statistical estimation), averaging for the year nearly 18 per cent. This would make the value of the undeposited exports of silver bullion about $16,400,000.

It is probable that not less than $100,000 worth of domestic silver

ullion was furnished by private refineries to jewelers and others for se in the arts and manufactures. Adding to the $32,305,036 domestic ilver deposited at the mints $16,400,000 as the undeposited silver exorted, and $100,000 consumed in the arts, would make the total silver roduction of the country during the year $48,800,000, or, at its comercial value, about $42,000,000.

This is some little less than Mr. Valentine's estimate of the silver prouction, $43,529,925, which is understood to be based upon the comercial value of the silver at the place of shipment, or at least for the arge silver-producing States and Territories, such as Colorado, Utah, rizona, Montana, and Nevada.

The contribution of the mines of each State and Territory, and of dif-erent localities, to the aggregate amount is less readily ascertained, es-ecially where numerous small mines are worked, and refiners and melters who receive their product keep no classified records, but in heir reports arbitrarily apportion to the different counties or States nd Territories the amount of bullion received.

After carefully comparing the returns and information obtained as to he yield of individual mines, the amount and value of bullion shipped t railroad stations and express offices in the mining regions, the re-orts from the mints and assay offices, from correspondents and from melters and refiners and dealers in bullion, I estimate that the mines f each State and Territory added, during the calendar year 1884, to the orld's stock of gold and silver at their coinage value as follows:

State or Territory.	Gold.	Silver.	Total.
laska	$200, 000	.....	$200, 000
rizona	930, 000	$4, 500, 000	5, 430, 000
alifornia	13, 600, 000	3, 000, 000	16, 600, 000
olorado	4, 250, 000	16, 000, 000	20, 250, 000
akota	3, 300, 000	150, 000	3, 450, 000
eorgia	137, 000	.....	137, 000
daho	1, 250, 000	2, 720, 000	3, 970, 000
ontana	2, 170, 000	7, 000, 000	9, 170, 000
evada	3, 500, 000	5, 600, 000	9, 100, 000
ew Mexico	300, 000	3, 000, 000	3, 300, 000
orth Carolina	157, 000	3, 500	160, 500
regon	660, 000	20, 000	680, 000
outh Carolina	57, 000	500	57, 500
tah	120, 000	6, 800, 000	6, 920, 000
irginia	2, 000	.....	2, 000
ashington	85, 000	1, 000	86, 000
yoming	6, 000	.....	6, 000
labama, Tennessee, &c	76, 000	5, 000	81, 000
Total	30, 800, 000	48, 800, 000	79, 600, 000

It may be instructive to compare this estimate with the estimates of production in previous years, and among the tables of general statistics will be found a statement of the amount of gold and silver yearly deposited at the mints and the official estimates (including those of my predecessor) of the annual production of the country; and also simila published estimates of other statisticians whose means of information entitle their opinions to consideration.

It will be seen that my estimates of the annual gold production since 1873, a period of eleven years, are comparatively but little in excess of the yearly deposits of domestic gold at the mints and assay offices; and adding to the latter the annual exports and consumption of undeposited domestic gold, the estimates are sustained in nearly every case.

DIVIDENDS.

Notwithstanding the reduced value of silver as well as lead and copper obtained from argentiferous ores, fifty-three incorporated companies working gold and silver mines are reported to have paid in two hundred and twenty-seven dividends about $7,567,698, and exceeding the amount returned by them to stockholders in 1883.

The published lists of profitable mines exhibit, as usual, numerous changes, old corporations disappearing from the lists and new and recently developed mines taking their places. Of the famous and lucrative mines of the Comstock Lode and Tombstone district, but one in each—the Kentuck in the former and the Contention in the latter—have paid dividends.

The amounts disbursed to stockholders during the year as profits from the working of gold and silver mines located in the respective States and Territories have been as follows:

States and Territories.	Mines.	Dividends.	Amount.
Arizona	3	4	$117,500
California	13	69	1,850,948
Colorado	14	34	1,419,000
Dakota	3	34	578,250
Montana	8	38	922,000
Nevada	5	18	201,500
New Mexico	2	3	190,000
Utah	5	24	2,257,500
Vermont	1	3	31,000
Total	54	227	7,567,698

ASSESSMENTS.

During the year 1884 some two hundred and seven assessments have been levied on one hundred and seventeen mines in California, Nevada, Utah, Alaska, and Arizona. Of the assessments levied it is estimated that over $4,000,000 have been paid. These assessments were distributed among the various States and Territories as follows:

Alaska	$3,400
Arizona	137,000
California	768,350
Nevada	3,632,950
Utah	68,000
Total	4,609,700

CONSUMPTION OF THE PRECIOUS METALS AND DISPOSITION OF THE ANNUAL PRODUCT.

The appropriation of gold and silver during the calendar year 1884 to industrial uses can probably be safely estimated at the amount stated in my last annual report, based upon reports received from nearly if not quite all of the principal manufacturers, namely, $14,500,000 of gold and $5,500,000 worth of silver, a total of $20,000,000. All of this, however, was not withdrawn from the existing stock of bullion and coin available for monetary uses, for those reports and the statements re-

ceived from the mint at Philadelphia and the assay office at New York, show the use of $1,882,600 gold and $414,600 silver of old jewelry, plate, &c., which, deducted from the total consumption, would leave the amount of coin and new bullion consumed in the arts and manufactures about $12,500,000 gold and $5,000,000 silver. I estimated that $6,000,000 of gold and $4,500,000 of silver of the domestic production of the year were used in the arts. These sums will probably represent the consumption of domestic bullion for the calendar year, although on account of the depressed condition of many industries and lower rates of interest to invested capital, the amount demanded for ornamentation would be lessened. If the value of the gold and silver bars consumed for these purposes was greater than here estimated, such bullion must have been obtained elsewhere than from the mints and assay offices, and the estimate of the production must be to some extent increased.

The amount and disposition of gold and silver on hand and received at the mints and assay offices during the year were as follows:

Classification.	Gold.	Silver.
Amount on hand January 1, 1884	$65, 667, 190	$5, 661, 840
Deposits of domestic production	30, 807, 200	32, 305, 036
Other bullion and coin	19, 712, 685	4, 366, 052
Total	116, 187, 075	43, 332, 928
Disposition:		
Used in coinage	23, 991, 756	28, 534, 866
Delivered to manufacturers for use in the arts	6, 082, 337	5, 977, 570
Delivered for export	22, 950, 000	2, 150, 000
Balance in mints January 1, 1885	63, 162, 982	5, 670, 492
Total	116, 187, 075	42, 332, 928

The product of the year and disposition may approximately be stated as follows:

Classification.	Gold.	Silver.
Production	$30, 800, 000	$48, 800, 000
Disposition:		
Deposited, less foreign	30, 000, 000	32, 300, 000
Undeposited exports	116, 000	16, 400, 000
Undeposited, used in the arts	684, 000	100, 000
Total	30, 800, 000	48, 800, 000

The value of the United States mint and assay office bars and domestic bullion exported during the year appear, computed at their coining rate, to have been as follows:

Classification.	Gold.	Silver.
United States mint or assay office bars	$22, 950, 289	$2, 148, 578
Hawaiian coin	.....	1, 006, 250
Undeposited domestic bullion	115, 963	16, 400, 000
Total	23, 066, 252	19, 554, 828

The tables of specie imports and exports show that, notwithstanding the large net export of gold during the year, a portion of the gold production has been retained and placed in circulation. The export demand reduced the stock of gold bullion in the New York assay office nearly $23,000,000, yet lessened but slightly the amount of gold coin in the country. The subordinate effect of increased circulation upon prices, and the more potent influence of expanding or contracting credits were again during the year, as often before, manifested in the fall of prices, notwithstanding an increase of paper and metallic circulation.

CHAPTER I.

ALASKA.

The following review of the mines of Alaska was prepared by E. R. idmore:

In the mining districts of Southeastern Alaska less gold was produced d less work done during the season of 1884 than during the corresnding period of the preceding year. The estimates of the yield of e placer mines, made by those best situated to know of the individual ccess of the miners, is $200,000.

On the 13th of May, 1884, Congress passed the act providing the eleton of a territorial government for Alaska, but as none of the prosions could take immediate effect it added nothing to the welfare of e mining interests of the year. The governor and the civil officers ere not appointed until July, 1884, and reached the country in Sepmber, at the close of the mining season. The act of Congress prodes for a governor and four commissioners, a district judge, a marshal, id clerk. The governor, among other duties, is required to "make an nnual report on the 1st day of October of each year to the President of he United States of his official acts and doings, and of the condition f said district with reference to its resources, industries, population, nd the administration of the civil government thereof."

The, clerk of the district court is "*ex-officio* recorder of deeds and nortgages and certificates of mining claims and other contracts relaing to real estate, and register of wills for said district, and shall esablish secure offices in the towns of Sitka and Wrangel in said district for the safe keeping of all his official records and records concerning the reformation and establishment of the present status of titles to lands as hereinafter directed, provided that the district court hereby created may direct, if it shall deem it expedient, the establishment of separate offices at the settlements of Wrangel, Ounalaska, and Juneau, City respectively, for the recording of such instruments as may pertain to the several natural divisions of such district most convenient to said settlements, the limits of which shall, in the event of such direction, be defined by such court, and said offices shall be in charge of the commissioners, respectively, as hereinafter provided."

The commissioners to reside, one at Sitka, one at Wrangel, one at Ounalaska, and one at Juneau, have the jurisdiction and power of commissioners of United States circuit courts, and exercise the powers of justices of the peace, and also "the powers of notaries public, and shall keep a record of all deeds and other instruments of writing acknowledged before them and relating to the title and transfer of property within said district, which record shall be subject to public inspection."

Section 8 of the bill creates the district of Alaska a land district, and, among other things, provides that "the laws of the United States relating to mining claims, and the rights incident thereto, shall, from and

after the passage of this act, be in full force and effect in said district under the administration thereof herein provided for, subject to such regulations as may be made by the Secretary of the Interior, approved by the President: *Provided*, That the Indians or other persons in said district shall not be disturbed in the possession of any lands actually in their use or occupation or now claimed by them, but the terms under which such persons may acquire title to such land is reserved for future legislation by Congress: *And provided further*, That parties who have located mines or mineral privileges therein under the laws of the United States applicable to the public domain, or who have occupied and improved or exercised acts of ownership over such claims, shall not be disturbed therein, but shall be allowed to perfect their title to such claims by payment as aforesaid: *And provided also*, That the land not exceeding six hundred and forty acres at any station now occupied as missionary stations among the Indian tribes in said section, with the improvements thereon erected by or for such societies, shall be continued in the occupancy of the several religious societies to which said missionary stations, respectively, belong until action by Congress. But nothing contained in this act shall be construed to put in force in said district the general land laws of the United States."

By reason of the civil officers arriving in Alaska so late in the year nothing could be done towards perfecting the titles to claims or settling the contests and embryo litigations in which every piece of property was involved. The officers had first to inspect the country and make their reports and suggestions to the officials at Washington, thus postponing all definite action to another year. Mining matters were thus at a standstill, and little beyond necessary assessment work was done on the quartz claims, and placer mining was not carried on to the extent of former years.

Gov. John H. Kinkead, in his annual report to the President, makes the following reference to the importance of the mining interest:

"This industry, in my opinion, bids fair to take front rank in value of product.

"In the vicinity of Juneau, on Douglas Island, extensive reduction works are nearing completion, one company alone having expended nearly or quite $500,000 in preparing for work. Their mine has already been explored sufficiently to insure large returns therefrom for many years.

"It is not probable that this locality is the only paying depository of gold-bearing quartz. In the vicinity of Sitka and in the region of Prince William's Sound and Cook's Inlet, as well as in many other places—in the Chilcat River country, for instance—the promises for the future are good. The geological formation and general characteristics of most of the islands in the archipelago and the contiguous mainland are apparently the same.

"I confidently expect that within the next decade the production of precious metals in the district will be an important factor in the finances of the General Government."

"THE ORES OF ALASKA.

"The presence of ores in the district is not a new discovery. The fact of their existence has long been known, but the industry has languished and been almost abandoned, for the reason that the only title to the property of the miner recognized was that of force; not always, but still frequently enough used to discourage and measurably prevent explora-

tion. This evil will be remedied by the introduction of civil law. The difficulties attending the successful prosecution of this industry are great. High and precipitous mountains, densely covered with timber and chaparral, fallen and decaying trees, the earth covered with moss and vegetation to the depth of one or two feet, seem almost to forbid the progress of the prospector.

"To compensate for this, however, there is unlimited water-power and an abundance of fuel existing almost everywhere and within easy access from the mining districts by any class of ocean steamers. The difficulties will be overcome and the natural advantages utilized slowly yet surely. The adverse conditions, indeed, do not exist even now throughout the entire country. Westward from about longitude 140, and north of latitude 60, the timber belt ceases abruptly, and on the Aleutian Islands and the shores of the mainland the country is open and free from the foregoing noted difficulties. The great interior, also, though having plenty of timber for all practical purposes, is generally well adapted to mining and successful exploration. With the development of the mining interests population will increase and other industries progress as a natural sequence.

"Coal, copper, and other minerals are known to exist in many localities in the district. To what extent they have been developed I am not yet informed, although I learn that explorations in this direction are being actively and energetically pursued."

When the court and surveyor secure right of possession to the owners of claims, much of the secresy and mystery maintained by them will be set aside, and it will be possible to obtain more definite as well as more complete statements of mining progress. The mine owners so far have nearly all been poor men, prospectors, who, having found rich claims, held on to them in the hopes of finally acquiring titles and being able to then sell for a profit to the capitalists, who had heretofore held aloof. None of them were willing to put money into mines to which there was no valid title and possession of which had to be maintained by force. For this reason prospecting has not been carried on with any great enthusiasm, and only the most general features of the geology of the country are known. The general formation is slate, with many faults and fissures, and the broken and upheaved strata dip at every angle. Quartz veins are found on all the islands, as well as on the mainland, and the multitude of narrow stringers and veins in the mountains around Juneau have led to the belief that thorough surveys and explorations would reveal a main lode of great size. The prospectors have only touched here and there along the coast, and the Government has done nothing in the way of surveys back from the high water line. With the limited knowledge of even the probable extent of ore veins on Douglas Island, properties already claimed and partly developed there aggregate in value twice the amount that Mr. Seward paid for the whole of Alaska, and Douglas Island is but one of the eleven hundred islands of the archipelago, on all of which there are promises of mineral wealth.

The majority of the miners at work in Alaska came from Arizona and were confronted with the most opposite conditions. While the winters at Juneau are no severer than in Kentucky, and the summers are of a cool, even temperature, mining can be carried on with less difficulty and fewer hardships than are encountered in the Leadville, Cœur d'Alene, and Southern Arizona districts. Instead of thin and rarified air and bare, burning sands, the miner found himself in a region of almost perpetual rain, and in cutting his way through the dense underbrush of

the forests sank knee-deep in the spongy moss that covers every foot of soil and rock. Except in the beds of creeks and on the higher slopes of the mountains not an outcropping ledge or rock can be seen, and the mineral treasures are so hidden and enveloped in this thick cloak of vegetation that prospecting is attended with the greatest difficulties.

Unsettled boundary lines.—An important question which demands immediate attention is the settlement of the boundary lines between Alaska and British Columbia, which, by the treaties of 1825 and 1867, were left vague, and are not yet determined.

Article I of the "treaty concerning the cession of the Russian possessions in North America by His Majesty the Emperor of all the Russias to the United States of America," concluded at Washington March 30, 1867, is as follows:

"His Majesty the Emperor of all the Russias agrees to cede to the United States by this convention, immediately upon the exchange of the ratifications thereof, all the territory and dominion now possessed by his said Majesty on the continent of America and in the adjacent islands, the same being contained within the geographical limits herein set forth, to wit: The eastern limit is the line of demarcation between the Russian and the British possessions in North America as established by the convention between Russia and Great Britain of February 28–16, 1825, and described in Articles III and IV of said convention in the following terms:

"Commencing from the southernmost point of the island called Prince of Wales Island, which point lies in the parallel of 54° 40′ north latitude, and between the 131st° and the 133d° of west longitude (meridian of Greenwich), the said line shall ascend to the north along the channel called Portland Channel as far as the point of the continent where it strikes the 56th° of north latitude; from this last mentioned point the line of demarcation shall follow the summit of the mountains situated parallel to the coast as far as the point of intersection of the 141st° of west longitude (of the same meridian), and finally from the said point of intersection the said meridian line of the 141st° in its prolongation as far as the Frozen Ocean.

"IV. With reference to the line of demarcation laid down in the preceding article it is understood:

"1. That the island called Prince of Wales Island shall belong wholly to Russia" (now by this cession to the United States).

"2. That whenever the summit of the mountains which extend in a direction parallel to the coast from the 56th° of north latitude to the point of intersection of the 141st° of west longitude shall prove to be at the distance of more than 10 marine leagues from the ocean, the limit between the British possessions and the line of coast which is to belong to Russia, as above mentioned (that is to say, the limit to the possessions ceded by this convention), shall be formed by a line parallel to the winding of the coast, and which shall never exceed the distance of 10 marine leagues therefrom."

Russian and British trades had many disputes about the location of the boundary line on the Stikine River, and after the discovery of gold along the bars of that river and in the Cassiar district at its headwaters many complications arose. The British custom-house and Hudson Bay Company's trading post were at one time 25 miles over the American line, and mining laws and revenue laws of both countries were set at naught. In 1867 Professor Leach established the line where the 10 marine leagues from the sea-coast ended at Berry's Bar. An officer from Fort Wrangel made a running survey, and determined its posi-

tion much farther inland. The gold commissioner of the Cassiar district once surveyed and located a town site at the great bend of the Stikine River within the United States boundaries, but, claiming that it was within the British Columbia line, he and others applied to the land board at Victoria for entry. In 1877 Mr. Hunter, an engineer of the Canadian Pacific Railway, made a survey of the Stikine River and erected a monument at what he determined as the eastern end of the 10 marine leagues. The American traders on the Stikine did not accept his lines as correct, and vigorous protests were made to the Treasury Department by Maj. M. P. Berry, collector of customs at Sitka. General O. O. Howard, after a special tour of inspection up the river, and the officers stationed at Fort Wrangel in command of troops repeatedly called the attention of the War Department to this unsettled boundary, but no definite steps were ever taken looking to the settlement of the question by a joint survey on the part of the United States and the Canadian Government. Frequent discussions in the House of Commons at Ottawa have shown how important the matter seemed to the members from British Columbia, while trade and mining enterprises maintained great proportions along the Stikine. Since the decay of its industries and the gradual abandonment of the Cassiar district less stress has been laid upon the matter; but the contest now bids fair to be transferred to the Takoo and Chilkat Rivers. British mining laws differing so materially from those in force in the United States, conflict will be precipitated as soon as the increasing number of miners and prospectors push further into the debatable regions along those rivers and discover new leads and deposits. All prospectors crossing by the Chilkat and Chilkoot portages to the Yukon have encroached on British territory and carried on their placer minings in violation of British laws.

Discoveries in British Columbia.—The continuity of the great mineral belt along the Pacific coast was further proven this year by discoveries of gold on Lorne Creek, an affluent of the Skeena River, distant 80 miles from its mouth. The discoveries were made in the early spring, and crowds from Victoria, Frazer River, and Alaska camps rushed to the new district. The excitement following upon the finding of some very large nuggets carried fishermen, Indians, and Chinese to the scene. Rich deposits were found on the Kitsim Kalim River, another tributary of the Skeena, in the fall, and parties were organized to go up on the ice in February and stake claims in advance of the regular mining season. This Skeena River gold is found in large coarse grains, varying from the size of peas to 2 and 4 ounce nuggets. B. W. Washburn and four men took out $3,000 in gold from one claim in a month, and others took out from $4,000 to $7,000 in the same time. Eight to ten dollars per day to the man were the average washings, and the deposit was evidently the same as that of the Cariboo, Cassiar, and Harris mining districts.

The Cassiar district.—The placer mines of the Cassiar district at the head of the Stickeen River in British Columbia were exhausted and the camps abandoned in 1884. The river steamers were taken off and the few white miners and freights were conveyed to the head of navigation by the Indians of Fort Wrangel in their canoes. When the claims were reduced to quartz veins the district had to be abandoned on account of the cost and difficulty of getting the necessary machinery up the river and over the narrow mountain trail. The white miners, diminishing in numbers for several seasons back, did not return to the diggings in 1884, and Chinamen took possession of the old claims and the rich tailings. The same conditions succeeded at all the camps along

the river, and on both sides of the boundary line Chinamen were the only miners, and it was impossible to get any estimates of the yield of the placers or the number of men employed. In consequence of the decline of the river traffic, Fort Wrangel, which, as a port of entry and a depot of supplies, was quite a busy place, lost much of its trade and importance.

The Harris mining district.—Hon. Andrew T. Lewis, clerk of the United States district court and *ex-officio* secretary and treasurer of the Territory, reports the yield of the placer claims in the Harris mining district in 1884, at $100,000, produced by the different claims as follows:

Name of mining company.	Post-office.	Gold.
R. F. Harris & Co	Juneau City	$12,000
Bulger Hill Company	do	10,000
Mike Powers	do	6,000
Powers & Connolly	do	7,000
Leary & McCloud	do	7,000
Nolan & Bulger	do	8,000
Williams & Dunn	do	3,000
Campbell, Coon & Hakrader	do	8,000
Newcomer & Ramsey	do	2,500
Pierce & Campbell	do	2,000
Sylvester McMahon	do	500
Thomas & Williams	do	2,500
Leroy & Decker	do	500
Nowell & Co	do	2,000
McGlinchey & Fallon	do	6,000
Breen	do	1,000
Powers & Co	Douglas Island	8,000
McCormick	do	4,000
Mammoth Mine	do	4,000
Montana Creek		3,000
Shuck District		3,000
Total		100,000

I am under obligations to many other gentlemen in Alaska for information kindly furnished in response to circulars sent them.

Mr. F. O. Downing, purser of the mail steamer and agent of Wells, Fargo & Co., who has the best means of knowing the amount of gold shipped by express and carried down by private parties, estimates the gold product of the year 1884 from the Harris and other districts at a total of $200,000, one-half of the amount estimated by him for the preceding year.

Mr. David Martin, a merchant of Juneau, estimates that the placer miners in the basin back of the settlement have taken out altogether as much as $200,000 in gold dust in the season of 1884.

Patrick McGlinchey, who furnished the data for Mr. Andrew T. Lewis's report, is one of the old miners and prospectors of the region, and he further writes that the gold from the Silver Bow Basin placers is fine and porous in quality, and is found in gravel beds varying from 4 to 30 feet in depth, worked by hydraulic process. It is saved by sluices and undercurrents, and the claims pay from $4 to $20 a day per man for the season of five months. The gold dust from the basin placers is valued at $16 per ounce, and that of the Douglas Island placers at $18 per ounce.

Mr. J. D. Sagemiller, of Juneau, to whom this bureau is already indebted for much valuable information concerning the Harris mining district, writes that almost no work was done on quartz claims in 1884, and that the yield of the placers was much less than in preceding years. He believes that the placer mines, which are only benches of decayed quartz on the hill-sides, ground and worn directly from the quartz veins

above, will not last more than two or three seasons longer, and systematic mining and milling must take the place of sluicing. Mr. Sagemiller bears testimony to the peaceable and industrious character of the Indians who are employed on many of the claims, and who, as efficient workers, take the place of Chinamen in the camp. With an equable and healthful climate, an abundance of water and timber, and facilities for shipping all necessaries by ocean steamers to within 2 and 4 miles of the very quartz veins themselves, he thinks that the future growth and importance of the country is assured.

Of this year's product of the placer mines, which he estimates at $50,000, the gold is sent in retort amalgam to San Francisco, where it sells at $17 per ounce. His estimate of the yield of the placer claims of the Silver Bow Basin and Douglas Island for the season of five months is as follows:

In Basin:	
Harris & Co	$9,000
Harkrader & Coons	6,000
Mike Powers	5,000
John Olds & Co	4,000
McGlinchey & Co	4,000
Luke Nolan & Co	5,000
John Leary	3,000
—— Church	3,500
John Dix & Co	1,500
Sylvester McManus	1,000
In Douglas Island:	
Nicholson & Miller	2,500
Mike Hayes & Co	2,500
Others in small sums, about	3,000
Total	50,000

Mr. Richard T. Harris, one of the original discoverers of the mines of this district, which bear his name, estimates the yield of the gravel claims at $100,000 for the season of 1884. Three hundred miners were employed in the district during the summer, wages averaging $4 per day, and the supply not equal to the demand.

Mr. R. G. Willoughby, one of the pioneers in the country, estimates the Placer mines, near Juneau, to have produced $75,000 during the season of 1884. Mr. Willoughby believes also that the placers will soon be exhausted and abandoned and attention directed to the quartz mining, which will soon make Alaska a great country. Mr. Willoughby cites many features of the country's resources which offer inducements to energetic and industrious settlers, and vigorously combats the common idea that it is a dreary and inhospitable region with perpetual frost. He instances the dense forests and the miles of river bottoms and meadow land, covered with wild grasses and grains, and abounding with berries of all kinds, as a promise for future stock-raisers and intelligent agriculturists. During the year Mr. Willoughby discovered two coal mines. One vein of bituminous coal, from 2 to 3 feet wide on the surface, was found on the south end of Admiralty Island. This mine was sold to Mr. C. C. Bartlett, of Port Townsend, Wash., who worked and prospected it further during the winter. Another coal vein was found by Mr. Willoughby 100 miles northwestward from his first mine.

Joseph Juneau, one of the original discoverers in the Harris district, successfully worked his gravel claims in the basin during the year, taking out from $10 to $30 per day per man. In June he sold his half interest in one of the richest of these placers to Powers & Co., for $3,300. None of the placers are now considered particularly valuable, and in a

few seasons they will be well exhausted and sold to Chinamen. Under these placers are quartz claims. Some of the croppings are very rich, but the main ledge from which these stringers radiate has yet to be discovered. Mr. William T. Coleman and other capitalists of San Francisco are interested in a number of these claims, but the interests of the dozen naval officers who had staked claims in the basin having been betrayed by the agent left in charge, their properties have passed into other hands. The trail from Juneau to the basin has been widened and improved during the year, and pack-horses are regularly employed in transporting goods. A month of clear dry weather in midsummer was of great help to the active workers, and insured an abundant water supply from the melting snows.

Douglas Island.—On Douglas Island the Paris or Treadwell mine, owned by the Alaska Mill and Mining Company, is still the most important property, and all interest has been centered in the work undertaken there during the past year. The mine is situated on the east shore of Douglas Island, 3 miles below Juneau, on the opposite shore of Gastineaux Channel. Rich pockets have been found on the small islets dotting this channel, and the sands of the beaches have been profitably washed for several seasons. The largest ocean steamer can enter the channel and anchor in 50 feet of water less than 100 feet from the high-water mark. The mill site is but 300 feet from the beach, reached by a steep path leading up a ravine, and a tramway and wharf can easily be built from the mill and reaching out to deep water. The ledge has been thoroughly prospected during the past three years, and the results determined by the aid of a 10-stamp mill. The Paris ledge is the largest gold-bearing quartz vein ever discovered in any mining region. It is described as a mountain of quartz exposed to view from base to summit, as open as the face of a quarry. Of the four tunnels with which the ore body has been pierced, one has been driven in 120 feet at the northwest end of the ledge, and the middle of the ledge has been cross-cut by another tunnel 500 feet long, running at an angle of 75° from the course of the lode, and 300 feet below the top. For 400 feet it passes through a solid ore body, samples of which assayed $10 to $15 per ton. At its terminus an upraise was made. The tunnel rock is soft, and can be mined and milled at less than $2 per ton. No dead work, no pumping, and no timbering will be required in mining the ore, and it can be blasted out in a face as in a quarry. In appearance it is a grayish fine-grained quartz, glistening with pyrites, but showing no free gold. The 10-stamp mill, while running, yielded an average of $2,000 per month. The air drill was used in boring the tunnels, and during the past season work had to be suspended for several weeks while waiting for shipments of blasting powder.

The Treadwell and the adjacent ledges on Douglas Island were not discovered until after those on the mainland. A party of miners arriving too late to locate claims in the basin back of Juneau, crossed over to the island and prospected along shore. One of them found the outcroppings of the great ledge. Mr. Treadwell, who had heard of the value of this claim, bought it for $150, or lending that sum to the discoverer for a stipulated time took the claim as security. In time he bought the adjoining claim, which, lapping 750 feet on the original claim, makes the Treadwell mine 2,250 feet in length. Five partners were then associated with him, and Mr. Treadwell remaining on the ground directed the operations by which the ledge was thoroughly prospected. While he was running tunnels into the body of the ore, squatters were washing off the decomposed quartz on the surface of the lode, and want

of civil government made the company powerless to prevent this outrage. With the passage of the act of Congress granting a territorial government to Alaska, and insuring titles and protection to property, the owners of the Treadwell mine made arrangements for immediately developing their mine. More water rights and house lots were bought, a large saw-mill, capable of turning out 15,000 feet of lumber in a day, was constructed, and a 3-mile ditch was dug and a stream of 2,000 inches turned in for mill purposes. Ground was cleared and foundations laid for a 120-stamp mill, which, when finished, will be the largest and most complete plant ever built in this country, including as it does every improvement in quartz-mill machinery. A force of 150 men were employed on these preliminary works, and in August a gang of Chinese and a force of masons and wheelwrights arrived with the first 300 tons of the machinery. The island immediately became the scene of the greatest activity. The Indian and squatters' camps increased quickly, prospectors started off in all directions, and adjoining properties increased in value tenfold. The ledge of the Treadwell was traced for miles and locations made. A party hunting timber for the mill, found a similar ore body 8 miles distant on the main land shore, in a direct line with the course of the Treadwell lode.

The owners of the mine have expended between $300,000 and $400,000 in these preparations for working their claim, and the mill was designed by the superintendent, Mr. John Treadwell, and is cited as the model mill by mining engineers. The mill was built in less than fifty days by the Risdon Iron Works of San Francisco, and shipped by steamer thence directly to the mine.

As described with illustrations and sectional views in the Mining and Scientific Press of September 27 and October 4, 1884:

"The mill is designed for the reduction of gold ore carrying sulphurets and free gold, and has 120 stamps of 900 pounds each, with a crushing capacity of 360 tons per day.

"The batteries are arranged in two lines, setting back to back, with the ore bins between, on the top of which are three 9-inch by 15-inch Blake rock-breakers, and six 5-feet by 10-feet grizzlies. In front of the batteries and in the battery-room are copper-plate sluices, and in front of the battery-rooms and below are the concentrator-rooms. In the battery-rooms, in convenient positions, are placed the cleaning-up pan and amalgamating barrel. At the end of the concentrator-room the water wheels for driving the machinery are placed, the whole arrangement being designed to make the mill as nearly automatic as possible.

"Each battery of 10 stamps is driven from the line-shaft by an improved friction clutch-pulley, so arranged that each 10 stamps can be started and stopped at pleasure. They are fitted with phosphor-bronze bushings, and accurately balanced, so that there is no tendency to 'wobble' or wear out of true.

"The motive power is furnished by two hurdy-gurdy water wheels, one of Pelton's patent and the other of Knight's. They are each 6 feet in diameter, and run at a velocity of two hundred and thirty-six revolutions per minute, the power being transmitted by twelve hemp ropes, 2 inches in diameter, running over grooved pulleys 12 feet in diameter. Either one of the water wheels is of sufficient power to drive the mill.

"The ore is taken from a tunnel in the side of the mountain and run into the top of the mill, which is on a level with the mouth of the tunnel; here it is dumped, and goes through the grizzlies and rock-breakers into the ore bins, from which it is drawn out directly into the ore feeders, which feed it into the batteries, where it is crushed wet and amalga-

mated for free gold. From the mortars the pulp is taken over copper plates, where any free gold which may escape is amalgamated. Then from the copper plates it is taken to and passed over the Frue concentrators, which save the sulphurets and the tailings, and sluiced off. From the concentrator-room the sulphurets are taken to the chlorination works, where they are treated for the gold which they contain by the chlorine gas.

"Some idea of the magnitude of the plant for concentrating the ore may be inferred from the fact that forty-eight Frue concentrators were purchased for the mill from the agents in this city. This is the largest single order the Frue agents ever received, and the largest number of concentrators in any mill in the world. The mill will be illuminated by several powerful electric lights, which will diffuse sufficient light to enable work to be carried on with the same facility in the night as in the day-time."

The owners of the Mammoth ledge, near the Treadwell property, are also making arrangements to build a large stamp mill and develop their mine. Powers & Co. and McIntyre & McCormick, mentioned in Mr. Lewis's estimates as having washed, the former about $8,000 and the latter about $4,000 in gold, were working the surface of this quartz location known as the Mammoth, and their success is another indication of the richness of the vein. With a 5-stamp mill the mine paid from $1,500 to $2,000 a month, but with the improved machinery and the immense supply of even low-grade ore, cheaply milled, it is expected to return between $60,000 and $75,000 per month.

Killisnoo.—Mr. Carl Spuhn, manager of the Northwest Trading Company at Killisnoo, estimates the yield of the placer mines at Juneau at $75,000 for the year. He also reports that no miners crossed the portages to the headwaters of the Yukon during the season of 1884, but that four men returning, who had crossed in 1883, reported good bar diggings.

Mr. J. W. Vanderbilt, of Killisnoo, reports that the gold discoveries nearest to his station were stringers of gold-bearing quartz found on the northwest end of Admiralty Island. No placers had been found and no attempts made towards quartz mining. Good coal croppings have been found at Kootznahoo and Murder Cove, on the southwest end of Admiralty Island, and the lands located by companies that have done considerable work in running tunnels and sinking shafts to open the coal seams.

Sitka mining district.—From the Sitka mining district the only report made is from Mr. Nicholas Haley, who, in addition to giving much valuable information, kindly rights some errors of location made in the report of last year. Mr. Haley being one of the pioneers in quartz mining near Sitka, gives a sketch of his experiences in that connection which I deem of sufficient importance as a matter of record to introduce almost entirely. He says:

"In August, 1872, Patrick Burns formed a company to work the 6-foot vein of quartz on Round Mountain, with Captain Olmstead of the Second Artillery, Lieutenant Rodgers, and Lieutenant Dodge as partners. I worked on this vein for them for ten days, when it appeared that the vein was badly cut by a horse of slate coming in and leaving nothing but a trace of the quartz between the walls. On reporting to the owners work was stopped. I believe that all the ledges on Round Mountain are of a wild-cat nature, although many fine indications have been found and hundreds of dollars thrown away in prospecting them.

"My own ledges at the head of Silver Bay, are 8 miles distant from those on Round Mountain, and have no connection with them.

"After quitting work on Round Mountain, Doyle told me of ledges on a small creek emptying into Silver Bay, and Captain Olmstead, Lieutenant Rodgers, and myself formed a prospecting party. Three-quarters of a mile up the creek I found a piece of white quartz of good grain, showing no sulphurets or gold, but resembling specimens shown me in Sitka. Following a small stream that entered from the northeast I found the ledge now known now as the Haley and Rodgers lode. The ore is very white and the surface of the ledge where it crosses the creek crops out for 6½ feet, the balance covered with heavy timber and a red soil stained by the heavy flow of iron water running over it from one of the large trees. On stripping the grass and moss from a large bowlder that had broken away from the ledge, I found some yellow sulphurets of iron. The first discoverers of this ledge, Mahoney and Doyle, never worked on it at all, as they considered the quartz too white to have any mineral in it. In October, 1872, I went back with four men and after nine days' work, stripped the ledge. I put in a blast and to my great astonishment threw out with this blast $350 in nuggets of gold, and three gold-pans full of arsenical sulphurets. Some of the nuggets I had to chisel from the hard rock. I took my samples back to Sitka and reported the discoveries to Captain Olmstead and Lieutenant Rodgers. There was great excitement at the discovery. Soon after this, Captain Olmstead was ordered East and I was left to fight my own battle. The Haley and Rodgers lode is 9½ feet wide at the depth of 48 feet, and a good foot and hanging wall, as in slate formation, runs east and west. These ledges are on a long range of mountains, running southeasterly before it reaches the ocean on the other side. All the claims that I represent run on this range of mountains in an east and west direction. They are struck by three distinct porphyry ledges, one of them about 60 feet wide, a mixture of quartz all through, assaying $6.50 per ton.

"Soon after the discovery of the Haley and Rodgers lode, I discovered another ledge, known as the Stewart Tunnel quartz lode. This ledge cropped out from 1 to 3 feet wide, and the gold was visible to the naked eye on all sides of the quartz. It showed no blue streaks on the surface, and the quartz was so white that no one thought much of my prospects, although I assured them that blue quartz would be found on sinking. Assessment work was done, and 5 tons of ore sent to San Francisco to be reduced, to get an estimate of the value of our ore. The returns showed a value of $7.50 per ton in silver and no gold, although we could dig the gold out of the rock with our pocket knives before shipping it on the steamer. The ledge is 14 feet from wall to wall, and there is over 4½ feet of blue-ribbon rock. The streak dips from the hanging-wall towards the center of the vein, with good tracings from where the blue streak ends to the foot-wall. There is all of 2 feet of good pay ore on this foot-wall, and in blasting fine specimens of free gold are found in the white body of ore. This pay-vein, or blue-ribbon rock, was increasing in width when the mine shut down. Major Stewart, Colonel Claywood, and I organized a company, now known as the Alaska Gold and Silver Mining Company, so that the Stewart mine has never really changed hands.

"The sulphurets of my Lucky Chance mine go $1,840 per ton by my rough roasting process in the forge. I am just holding my claims, doing assessment work and crushing ore by hand mortar and working placers when I have sufficient water. I am now digging a ditch to bring in a larger stream of water to work the placers with. Each year I take out

enough gold to cover all outlay and expenses. The Lucky Chance rock shows enough free gold to satisfy me that it is rich enough without assaying, but I inclose you these results of assays of other ore specimens made by Williams, of Philadelphia:"

Result of assays.

Record No.	Mark.	Gold per ton.	Value.	Silver per ton.	Value.	Total value.
		Ounces.		*Ounces.*		
1913	Ribbon Rock, near Sitka	14.43	$298 27	17.65	$19 77	$318 04
1914	Stewart mine, 48 from surface	.03	62	3.68	4 12	4 74
1915	Haley & Rodgers lode, near Sitka	.03	62	4.88	5 46	6 08
1916	Wicher Falls, near Sitka, October, 1882	.07	1 45	2.44	2 73	4 18
1917	Stewart mine	5.02	103 76	3.99	4 47	108 23
1918	Stewart mine, near Sitka, quartz	trace.		2.88	3 19	3 19
1919	Stewart mine	.55	11 37	3.03	3 39	14 76
1920	From one of Haley's ledges, near Sitka	.02	41	2.63	2 95	3 36
1921	From one of Haley's ledges	trace.		2.06	2 32	2 32
1922	Stewart mine (quartz with slate)	.10	2 07	2.58	2 89	4 96
1923	Lucky Chance	trace.		2.01	2 25	2 25
1924	Haley & Rodgers	13	268 71	15.20	17 02	285 73
1925	Wicked Falls, special assay	.03	62	2.53	2 83	3 45

CHARLES P. WILLIAMS.

PHILADELPHIA, *October* 12, 1882.

The Big Specimen, Wicked Fall, Lucky Chance, Haley and Rodgers, Banner Quartz lode, and Ribbon Rock mines in this group, owned by Nicholas Haley and Sons and M. Craigin, of Sitka, are rich mines and produced some gold during the year, although no definite statements of the amounts could be had.

During the summer prospecting parties from Sitka made trips into the interior and across Baranoff Island and found indications of gold in several places. They were convinced that a more thorough search would reveal mines equal to those worked by Haley and his sons on Silver Bay.

The Yukon district.—The Yukon River, and more particularly the territory about its headwaters, still tempt many prospectors from Juneau northward. The route over the Chilkat and Chilkoot Passes, opened by miners in 1879, have been traversed by parties each season, and varying reports are brought back of the richness of the country lying beyond the divide. Two military expeditions were sent out by General Miles commanding the Department of the Columbia, ordered to explore the region lying between the Chilkat Pass and the Copper River. Both parties returned in the fall without having gone beyond the route of previous explorers and prospectors, or having ascertained anything more as to the mineral resources of the country. A new expedition under more experienced leadership, was ordered by General Miles to leave Sitka in February, 1883, and, ascending Copper River on the ice, make progress towards its headwaters during the summer.

Prospectors and explorers after crossing the Chilkat and Chilkoot Passes are in British territory until they reach Fort Reliance, 300 miles distant. Mineral discoveries within that region are of interest, but are of no value to United States records, for as soon as camps or settlements are established British surveyors and gold commissioners will be sent to enforce their rigid laws. The boundary line is not located at any place along the route, but discoveries of any great importance will at once raise the question, and the United States prospectors will have expended their energies to no avail.

pecting at haphazard along the rivers and tributary streams they ound many rich deposits. On the Lewis, Stewart, and Pelly , which form the Yukon, bars were found that paid from $5 to day to the man. Over $1,000 in gold, just taken from these bars, ought to Juneau last season and quite an excitement created. rospectors will go out next spring, but as the season is so short interior and the difficulty of reaching the grounds so great they obably be gone more than a year.

prospectors that left Juneau in the spring of 1882 returned after ence of two years and reported finding gold in all the streams ng into Stewart River. They prospected the bars and tributa- that river for 200 miles from the point where it joins the Yukon, gold in paying quantities. It was the intention of these men e a second trip to the Yukon country, taking schooner to the of the river and ascending by small boats to the rich gravel de- instead of descending from the Chilkoot Pass.

party of prospectors took out $700 in gold dust from a bar on lly River, and found many quartz leads.

fur traders reported finding placers near Fort Reliance, and ore uartz leads near the same place was sent to San Francisco to be d.

experience of the Schiefflin brothers, who went to the Yukon with ecting party of picked Arizona miners, well equipped and provis- or a three-years' stay, led many ambitious prospectors to attempt ow them. The Schiefflins sold their boats, tools, and supplies ighteen months' stay and left. They found many good indica- especially in the region where a range of hills, known as the arts, are aligned with the river's course. They were convinced old existed all through the Yukon country, but its remoteness ll base of supplies, and the long severe winters of the interior, mining season of four months too short to be profitable. A dozen are now reported as working the placers found by the Schief-

CHAPTER II.

ARIZONA.

The result of mining operations in Arizona during the year, measured by the output of the precious metals, has not been entirely satisfactory to those engaged in this industry, as it shows a decreased production of $650,000.

The decline in the yield was more marked in the *Tombstone district*, occasioned chiefly by the strike among the miners for higher wages and the consequent shutting down of most of the large mines during a portion of the year. The shipments of bullion show, on the other hand, greater success in the newer camps and mining localities, and indicate a favorable development of new properties.

The mineral fields of Arizona have been very superficially prospected as yet, and its advantage over other mining regions in its equable climate, permitting work to be prosecuted throughout the entire year, has been more than counterbalanced by the high rate of freight and the want of reduction works.

The two railways now being constructed will traverse sections rich in mineral wealth, as well as in timber, farming, and grazing lands. They will open up Tonto Basin and the Mogollon forests, and connect Mineral Park, Flagstaff, Ashfork, Prescott, Tucson, and the other leading towns, making the people more homogeneous, and opening the resources of these sections to immigration.

The Arizona Canal, another important enterprise, is approaching completion. This canal has a channel 22 feet wide, banks 7½ feet deep, and is to be 40 miles in length, and the purpose of its construction is to conduct the waters of Salt River, through the valley of Maricopa, into the Aqua Fria. This canal will furnish water to reclaim upwards of 100,000 acres of land, and will supply power for mills and smelters along its line.

Of the ten counties of the Territory, nine are producers of the precious metals.

Cochise County contains the most important mining camp, Tombstone, and the largest bullion producers, the Contention, Grand Central, and the Tombstone Mill and Mining Company. It is in this county that the large falling off has taken place.

Gila County is rich in copper mines.

Graham County has immense ledges of copper now producing, and large undeveloped gold-bearing gravel deposits.

Maricopa County contains the only distinctive gold mine, the Arizona Central (late the Vulture), which is producing nearly $30,000 per month.

Mohave County has been practically isolated by its mountains, and while some very rich prospects have been worked during the last ten years its mineral resources have scarcely been developed.

Pima, Pinal, and Yavapai Counties contain many valuable producing properties, while Yuma bids fair to become an important mining country,

and already contains one of the most successful silver mines in the Territory, viz, the Clip.

The Tucson Star estimates the production of the Territory during the calendar year 1884 to have been about $5,000,000, distributed as follows:

TOMBSTONE SILVER.

T. M. & M. Co., gold, $38,752; silver, $397,326	$435,018
Grand Central	483,882
Boston Custom Mills	106,888
Benson Smelter (value of total product)	898,800
United Verde	300,000
Vekol Mine	88,000
Jesse Benton	48,300
Shipped through Yuma express office	191,940
Shipped through Tucson express office	136,032
Total	2,683,920

ESTIMATED.

Yavapai County, not reported	450,000
Mohave County, not reported	250,000
Arizona Central	60,000
Silver King	800,000
Pinal Consolidated	20,000
Head Center	25,000
Mineral Hill	15,000
Golden Rule	30,000
Tevis district	12,000
Districts not mentioned	600,000
Total	4,950,920

The copper output for the year was about 27,000,000 pounds, produced as follows:

Copper Queen	8,048,000
Detroit Copper Company	3,000,405
Old Dominion	5,125,000
Arizona Copper Company (Clifton) estimated	2,225,000
Cochise Copper Company	607,632
United Verde	5,000,000
Copper Prince (ore) produced bullion	545,000
From ore shipped from Benson	882,030
San Carlos (estimated)	125,000
Copperosity	112,000
Casa Grande	78,847
Bullion from ore shipped from various districts	984,074
Estimated bullion from copper matte	263,493
Total	27,006,481

Mr. Valentine, in the annual circular of Wells, Fargo & Co., credits the Territory with the following production for 1884:

Gold dust and bullion	$460,791
Silver bullion	3,139,628
Ore and base bullion by railroad	3,455,960
Total	7,056,379

The latter item consisted almost entirely of copper and lead. In both of the above estimates the value of the silver was calculated at its commercial value.

Mr. A. M. Lawver, of San Francisco, who compiled the following r view of the Territory, estimates the production to have been—

Gold	$931,7
Silver	4,825,0
Total	5,756,8

In Mr. Lawver's estimate the silver was computed at its coining valu in silver dollars.

After a careful review of the shipments by express and railroad, tl statements of refineries, and the amount of unrefined Arizona bullic reported to have been deposited at the San Francisco mint and Ne York assay office, I have estimated the production of the Territory f 1884 to have been—

Gold	$930,0
Silver	4,500,0
Total	5,430,0

Which, as nearly as could be ascertained, was produced in the sever counties as follows:

Counties.	Gold.	Silver.	Total.
Cochise	$250,000	$2,130,000	$2,380,
Gila	10,000	100,000	110,
Graham	30,000	20,000	50,
Maricopa	400,000	50,000	450,
Mohave	30,000	240,000	270,
Pima	90,000	200,000	290,
Pinal	50,000	680,000	730,
Yavapai	40,000	900,000	940,
Yuma	30,000	180,000	210,
Total	930,000	4,500,000	5,430,

Dividends have been paid during the year by the following mines:

California	$8,5
Contention Consolidated	62,5
Copper Queen (copper)	200,0
Silver King	50,0
United Verde (silver and copper)	60,0
Vizina	5,0
	386,0

COCHISE COUNTY.

The year opened very propitiously for the mines of this region; drai ing of the water had begun; the existence of ore bodies below the wat level was no longer in doubt, and miners generally had settled down the development of the lower levels with the conviction that they wou be rewarded by the opening of large and permanent bodies. In M these sanguine hopes were dispelled by a strike among the miners whic becoming general, closed all the mines for that month. Deeming le than $4 an insufficient return for a day's labor, the miners formed union and, supported by others from Bodie, California, and Virgin City, Nev., pressed their demands so firmly that at one time it w necessary to call on the military for protection. The owners of mini properties held that until the water was controlled they could not affo to pay more than $3 a day for the reason that the ore obtained abo the water level was of too low a grade to justify a higher rate of wage

After a struggle which lasted nearly four months the miners yielded, the union was dissolved, and the principal mines have one by one resumed operations.

The Contention mine has been closed down since the strike of the miners, therefore its production is only for four months.

The Grand Central mine has been in operation for nine months during the year, and has made a satisfactory production for that period.

The West Side mine continues to be one of the principal producers of this group, sending the usual amount of ore to mill and furnace. The two steam hoists, on the same ledge, 1,000 feet apart, are kept continually at work.

During the year an air compressor has been put in place with power sufficient to run three Ingersoll drills, saving much time in running drifts and cross-cuts. The ore bodies on the fifth level are developing favorably, the ore being of good grade and easily mined. The stopes between the third and fifth levels look well, and are turning out their usual amount of ore. A considerable quantity of telluride ore has been taken out, and an increase of lead in the ore is reported. The different levels from each shaft connect with each other, thereby giving an excellent circulation of air in the stopes.

In the Ground Hog mine, while drifting on the 150-foot level, a body of rich ore was encountered 60 feet from the main shaft. The main shaft is down 202 feet, and in running a drift on the 200-foot level another body of ore was met about 100 feet from the Union shaft, which proved to be about 7 feet thick, carrying 50 ounces of silver to the ton and containing a streak of ore 2½ feet wide, which assayed from 150 to 300 ounces. With present facilities it does not pay to take out ore containing less than 60 or 70 ounces, and consequently workmen have been employed only on this streak. Some 300 tons of ore, running from 40 to 50 ounces, are on the dump, which will net about $10 per ton.

The Lucky Cuss, the property of the Tombstone Milling and Mining Company, is being worked by three different shafts, and is turning out a considerable quantity of manganese ore, which is used at the furnace with other ores to good advantage.

On the Randolph an incline has been run, mostly through hard limestone, to connect with the ore bodies below.

In the Luck Sure the new vertical shaft has been sunk to a depth of 240 feet. It is the intention to sink this shaft 60 feet deeper, when drifts will be started, one to the south to cut a large body of ore developed at the bottom of the old workings, and one to the northeast to cut the upper ledge at a depth of 350 feet. Work has been steadily pushed on the ore body of the north chimney, and some high grade manganese ore taken therefrom. A drift from south of the main shaft on the 175-foot level gives evidence of being in close proximity to an ore body in that direction. Work has also been prosecuted on a new surface prospect located about 100 feet southwest of the main shaft, showing quite a body of galena, and at the south end of the claim a number of "blow-outs" with heavy iron cap. Very little work has been done on this part of the claim, but indications point to a succession of chimneys of ore similar to those on the north end.

The Head Centre mill has run about seventy days on ore from the Head Centre and Tranquillity mine, and about five days on tailings. The mill has 10 stamps and crushes 2½ tons of ore per stamp every 24 hours.

On the Head Centre and Tranquillity mine, which has been idle so long, a force of 18 men is employed, and it has been put in excellent condition. The shaft is being pushed and is now down about 100 feet,

and good ore is being taken from the bottom. The ledge varies from a few inches to 4 feet. A winze from the 75 foot level is being sunk on ore, from which sufficient of high-grade material is being daily taken to pay the entire running expenses of the mine. The ore from the bottom of the winze and shaft is of a very fine character. A new shaft has been started still further north, and some ore has already been taken from it.

At the Emerald mine hoisting works brought from the Sunset have been recently started up. Other buildings have been erected and a large force of men employed. Connection was made on the 200-foot level between the main shaft and a winze sunk from the north end of the drift on the 150-foot level, exposing a large body of ore and giving an excellent circulation of air.

The Prompter has developed an extensive ore body on the 200-foot level in the drift run to strike that encountered on the level above. The whole face of the drift is in high grade carbonate ore, sprinkled with horn silver, which has been penetrated 7 feet.

The Knoxville and Stonewall has continued its regular shipments. Work is being prosecuted on and below the 340-foot level. The ore chimneys retain their usual size, and the ore in the lowest workings being of as good grade as that found on the upper levels. About 80 tons per week are sent to the mill. The Knoxville ore contains so much manganese, iron, and lime as to give it a special value as a flux, and nearly the whole amount produced has been sold to the smelting companies at Charleston, Benson, and at Socorro, N. M. The working force averages fourteen men per month.

During the year work has been actively pursued on the Gerard mine. A force of ten men has been steadily pushing developments, and some ore has been shipped.

From the Mammoth shaft, the most easterly on the property of the Rattlesnake Mining Company, about 12 tons of ore are taken daily.

A considerable quantity of ore has been taken out of the Lima Consolidated, and worked in the furnace of the Tombstone Milling and Mining Company with very satisfactory results.

In the Town Site the south shaft is down 75 feet. In the last 30 feet four different stringers of ore have been cut, all dipping east toward the west side ledge. A streak of ore was cut in the northeast corner of the shaft, but present developments have not shown its extent. A trial lot of ore shipped from this mine to the Boston mill gave a return of 87½ ounces of silver to the ton; and a drift started at the depth of 50 feet in the old shaft broke through into a 2-foot vein of low grade chloride ore.

A new shaft has been started on the Silver Cord a few feet to the southeast of the old shaft in anticipation of striking the ledge which runs through the Head Centre and Silver Thread mines.

A small streak of good grade ore has been encountered in the main shaft of the Township and Metallic Accident, which is being prosecuted and promises well.

Some ore has been found in small quantities in the State of Maine. A small force of men are kept busily engaged on prospect work, which promises well.

Work is being pushed on the Silver Thread mine, and some fine ore is being produced. The vein is small, but the ore assays high.

Cochise district.—The Peabody mines are in excellent condition. The furnaces are kept busy, and there is an abundance of ore.

The old Russellville mines have 1,000 tons of ore on the dump and a force of fifty men at work.

Cabezas district.—The village of Dos Cabezas is situated about
s from Wilcox and the Southern Pacific Railroad, on a high table
the foot of the Dos Cabezas Peaks. It has an excellent climate
abundance of wood and water, the water being remarkably pure
e from mineral. The mines are principally gold and silver, gold
inating and of a free milling class.
nnel was started on the Juniper mine, which, at a distance of
t, struck the ledge at a depth of 250 feet, which proved to be 12
le at the tunnel level, and of the same class of ore as that in the

rs. Fowler & McGregor have built a road connecting their Min-
rk mines at Maple Grove with the summit at Silver Camp, 2
istant, at a cost of $7,000. They have erected a five-stamp mill
outlook is promising as the ore is rich. This mine is within 7
Wilcox.
shifts of men are at work on the Mina Chiquita group, sinking
ie of Balser's California whims. The main shaft has reached a
of 175 feet, with the ledge steadily improving in width and carry-
same class of rich silver ore as on top. Several car loads of
shipped to Denver, Benson, and San Francisco have paid well.
Tornado Mining and Reduction Company is in successful opera-
d the developments in the First Chance mine show a continued
e in width of the ledge as depth is attained.
Old Judge group consists of the Old Judge, Apple Blossom, and
garten. The claims adjoin the First Chance on the south. A
is being run to tap the Old Judge ledge at a depth of 40 feet, as
ended to chamber out and sink on the ledge from the tunnel
This ledge is 40 feet wide at its intersection with the tunnel and
at a point 400 feet south of the tunnel. The ore is free milling
n stained and assays from $12 to $30 per ton.
Eaton mine has a shaft 40 feet deep, and at the botton the ledge
et wide. The ore will all mill $12 per ton.
Bear Cave is on the same ledge as the Juniper, and lies north of
ton. Its developments are a shaft 135 feet in depth and a tunnel

he Ewell Springs mine considerable work has been done, the ore
l by arrastra process assaying $12 per ton free gold.
Dunn is 35 miles from Wilcox. The ore is low grade, silver
ıg, yielding $8 silver and 30 per cent. lead per ton.
smelter of Salisbury & Co., at Benson, has proven of great im-
ce in developing the mineral resources of the Territory. In its
t mines are worked and ore shipped from all sections of the coun-
Even far off Mohave contributes, the ore from that section being
d by way of Kingman across the Colorado at the Needles, then
by Mohave and the Southern Pacific to Benson. The company
s on an average five car loads of ore, coke, and flux daily, and
es about 75 tons of bullion of an average value of $500 per ton.
erable rich ore is also received from Sonora. The company own
l mines in the vicinity of Harshaw. They employ in all about
n. The production of this smelter for the year is reported to
een:

.....	$48,000
.....	680,000
.....	72,000
	80 .000

GILA COUNTY.

Globe district.—The Mac Morris mine has remained idle during th year.

Work has been resumed in a systematic manner on the Home Ticke mine, on Quartzite Hill, which is thought to be a valuable property When last worked the ledge grew larger and richer as depth wa attained.

The Fame silver mine, on Quartzite Hill, promises to become one o the rich producers of Globe district. There are about 800 tons of or on the dump, which will assay from 50 to 100 ounces per ton. Only small force of men are at work, pending the purchase of a mill whic they expect soon to erect at the mine. When this is done the workin force in the mine will be increased if necessary. The mine is worke on an economical plan, there being no hoisting to do. Four tunne have been run into the hill, and in each there is good ore. The ore very tractable, being chloride and free milling. The vein worked about 3 feet wide, and some very rich ore has been taken out. Thei is an abundance of wood in the vicinity and a well of water close t the mine, and with a mill on the ground the ore can be worked ver cheaply.

The Silver Era Smelting Company have over 100 tons of ore at the smelter, which they expect to start soon. It has a capacity of 12 ton per day.

The Old Dominion Company is turning out 10 tons of copper bullio every day.

One of the most promising claims in the district is the Monarc Considerable work has been done on it and the mine is developin finely.

Mineral Creek district.—This is undoubtedly one of the richest copp districts in the territory. There appears to be a belt of mineral 2 to miles wide, running from Mineral Creek, in a southeasterly directio crossing the Florence road at Cane Springs, and extending to Tweed Camp on the Gila.

The Ray mine has sixty men employed, and there are 7,000 tons of or on the dump. The success of this company will tend to make this dis trict one of the most prosperous in the Territory.

Gold Hill and Lost Gulch district.—This district, although little know is one of the richest mineral sections of Gila County. It is distinctivel a gold district and possesses several very promising claims, which ar being developed.

The Genevieve and Manzanita are developing finely. The vein i the Manzanita is said to be from 3 to 4 feet wide, and assays well.

GRAHAM COUNTY.

Bunker Hill district.—A gold discovery is reported in this district a a depth of 100 feet, the particulars of which could not be learned.

A rich strike of chloride ore has been made in the mountains nea Hewey's Station. Rich float has been found in that vicinity upon sev eral occasions.

Clifton district is purely a copper district.

The Arizona Copper Company, the Detroit, Modoc, Great Western, Clifton, Copper King, and others are pouring out a stream of this metal such as the world has never before witnessed.

De Frees district.—There are some mines that give promise of yielding a good revenue in the future in silver, notably the Nez Percés and North Star, but they are as yet only partially developed.

MARICOPA COUNTY.

Care Creek district.—The Ithaca Consolidated Gold and Silver Mining Company own a group of six mines, situated about 40 miles north from the town of Phœnix. They are in the same mineral-bearing belt as the Vulture and Silver King mines. The ledge can be traced along the surface for a distance of about 4,000 feet and is found between two of the most desirable formations—granite on the southeast and talc slate on the northwest. The lode is not only a contact vein, but is said to be a true fissure, pitching east at an angle of 35° and running north-northeast and south-southwest. The ore is rich and uniform in character and mills $200 per ton in gold and silver. Wood and water are abundant.

The Lion mine, on Gold Hill, has been developed by a tunnel, in which, at a distance of 140 feet, the ledge has been tapped over 100 feet below the old workings. It is 4 feet in width and very rich in gold.

The opening of the Golden Fleece custom mill has given impetus to the mining interests of this district. The machinery of this mill, however, is only intended for the saving of gold and silver, the baser metals, calculated to make ores refractory, cannot be handled. This has led to the ordering of concentrators in connection with the mill. There are between forty and fifty claims on Cave Creek that will pay for chloriding, and Camp Creek and the Magazine district—in fact the entire mineral section northeast of here—present many advantages.

From its discovery the Red Rover has paid handsomely and has helped in the partial development of this section.

A stock company, with a capital stock of $200,000, has been incorporated to work the mines about 20 miles north of Phœnix. Twenty thousand shares have been set apart for the purpose of working the mines.

The Arizona Central Mining Company, formerly known as the Vulture, the largest gold mine in the Territory, has continued to yield a steady flow of gold from its low-grade ore with the aid of its 80-stamp mill.

In the vicinity of Wickenburg are situated a number of mines.

The Silver Star, 12 miles southeast, is a silver mine, and has produced about $6,000 up to July, 1884, with the labor of two men. It has been shut down temporarily on account of water.

The Carbonate is a gold mine, 13 miles southeast. It is worked by arrastras, and has produced $1,000 to date by the labor of one man.

The Galena, 16 miles southeast, has a shaft 80 feet deep, and a tunnel 100 feet on the vein, all in ore that will work 120 ounces per ton. It has shipped 5 tons that yielded 150 ounces per ton.

In addition to the above, there are a number of small mines being worked by horse arrastras and a number of miners working dry placers, within from 3 to 12 miles of the town, which produce from $500 to $1,000 per month.

There are a number of mines, both gold and silver, being opened with good prospects, which will increase the yield considerably.

The Little Hanover has a shaft down on a ledge 12 feet wide which shows indications of widening. The ore assays well in gold and silver, and preparations are in progress for extensive development of the property.

MOHAVE COUNTY.

A correspondent says of this county:

"Have been in a dozen different districts in this county, and all of them have prospects equal to any in the Territory, but the develop-

ments as yet are hardly sufficient to attract the attention of capitalists. The Wallapai Range has a very extensive showing of well-defined belts, strong ledges, contact formations, and excellent surface indications, both as to character and quantity of ore. I have formed my opinions on personal observations, and from furnace tests of the ores from different districts."

Hualapai district.—Stockton Hill in this district is the camp nearest to the railroad, and has been awakened from the lethargy of years to life and activity. It takes the lead of the wealthy mining camps of the country in the great variety and richness of its ores, as well as in the number and extent of its mineral-bearing ledges. Here are found veins of gold, silver, lead, copper, antimony, zinc, and other minerals, only needing capital and labor to enable them to add their hidden stores to the wealth of the country. There are now some fifty men engaged in mining on Stockton Hill, while more are being added every few days.

The Franklin mine is being worked on a piece of ground between two shafts, and some fine ore has been taken out, which, on being sorted into two classes, assayed 300 and 100 ounces in silver to the ton respectively.

The Moonbeam mine shows rich metal, a car-load of ore recently taken out sampling 397 ounces of silver per ton, while the second-class ran about 90 ounces. The owner is occupied in sinking and stoping, and takes out about 2 tons of first-class ore and 5 tons of second-class per week.

On the Cupel mine the ore dumps are being sorted, and the ore shipped to Pueblo with profit.

The Infallible is working three shifts. A tunnel is being run to tap the ledge. This was rendered necessary by the filling up of the shaft with water by the immense rain-fall of the past winter and spring. The tunnel is in 180 feet, and good-paying ore has been reached, which is widening out almost every foot. At last advices they had 14 inches of galena and quartz, showing wire and native silver.

The Prince George is working eight men and producing 4 or 5 tons of 80-ounce ore daily.

The Miners' Hope, working two men, is producing 150-ounce ore at the rate of a car-load every month.

The Sixty-Three is working two or three men and producing small quantities of high-grade ore.

On the Gibralter mine ore is being taken out that will average 4 ounces in gold and 100 ounces in silver per ton. They have 5 or 6 tons of this class of ore on the dump. They are now stoping out to the surface from the 30-foot level, besides sinking the main shaft, which is now down about 80 feet, and showing 6 inches of $200 ore at the bottom.

On the Southern View, at Wallapai Mountain, ore is being taken out assaying $600 per ton.

The C. O. D. mine is shipping a car-load of 80 to 180-ounce ore every two weeks, working three men.

The Railton mine, below Stockton Hill, has a 2-foot vein of lead ore, averaging from 25 to 30 per cent. of lead and 75 ounces in silver.

The I. X. L., Star Spangled Banner, and several other claims are being worked at a profit.

The Stand By is situated on the dividing ridge between Cerbat and Stockton. It is some ten years since this claim was located, and more or less work has been done on it; but no shipments were made until the present proprietor took hold of it, and in February last shipped a

carload to San Francisco, which sampled 25 ounces in silver and 45 per cent. of lead. A tunnel is now being run on the ledge and is in 50 feet, showing about 7 inches of solid galena in the face.

The Directory lies in the cedars at the foot of Stockton Hill, and was bought by the present proprietors, Messrs. Moore & Lavaree, for the insignificant sum of $85, some few months ago. They commenced operations by starting a tunnel on the opposite side of the hill to where the former owners worked, and expect to tap the ledge in about 200 feet. This tunnel is now in 180 feet, and is being driven at the rate of 1 foot per day. When in about 80 feet a ledge of good-looking ore was cut, which was about 5 inches wide, and assayed $250 per ton. The existence of this ledge had never been dreamed of, as no signs of it exist on the surface. Levels were run, both north and south, and some 20 or 30 tons of ore taken out which yielded from 150 to 400 ounces in silver per ton. The north level is now being stoped out to the surface, three men being engaged in this work alone. In the stope the ore streak has widened out to 9 inches, while the character of the ore is considerably improved. This mine now produces about 1 ton per day of high-grade ore.

Cerbat Camp shares in the activity of this district.

The Cerbat mill has been leased, and is running night and day on free milling custom ores. The lessees of the mill also have a lease on the Paymaster, and are taking out ore from it in paying quantities. Nearly all the chloride ores in this district are being worked at this mill.

The Champion, which has been released from litigation, is preparing to produce lead ore on a large scale. At present a car-load is the amount being shipped. Large tanks are being built preparatory to putting in concentrators.

The Black and Tan is an old location with a good reputation for high-grade ore. The developments of this claim consists of two tunnels run in on the ledge at opposite sides of the gulch, one being about 80 feet and the other about 340 feet long. The streak now being followed shows every indication of widening, and appears to be similar in appearance, and equally as rich, as the streak in the face of the tunnel below, which is about 5 inches wide and will mill about $400 per ton.

A contract has been let to sink 100 feet on the Flores, and many other small claims here are being worked on a small scale.

The Leadville mine near Cerbat is shipping some ore.

At Todd Basin, the Prosperity has just shipped 15 tons of high-grade ore, the result of two men's labor for one month.

Sherman's mine is producing 2 tons of good lead ore daily, working two men.

The Alpha is working three men and shipping a car-load of 350-ounce ore every two or three months.

The New London mine has recently completed the erection of steam hoisting works, and a shaft is being sunk. Three men are taking out 8 tons of galena from this mine daily. All low-grade galena and screenings are now concentrated at the mine and then shipped to the Benson smelter.

At the Todd mine some ore is being produced for shipment.

Many of the mines at Mineral Park are idle. The Mineral Park mill and the Keystone mine were about to start up at last advices.

The Starke and Ewing, which was located as long ago as 1871, is the first south extension of the Fairfield, and lies between the Fairfield and Keystone, the latter two being the best known mines in Mohave County. The Starke and Ewing takes in all the ground between the

two above-mentioned mines, some 400 feet in length along the ledge. Although it is little more than a quarter the usual length of mining claims, it more than makes up for it in the width and extent of the ore body. Two men are sinking a shaft, which is now down 28 feet, 6 by 8 in size, and is all in ore. The croppings above the shaft are from 22½ to 50 feet wide and assay $43 in silver. The ore-body has not yet been cross-cut, but the surface indications show a width of at least 18 or 20 feet. What this large body of ore will average of course cannot be determined at present, but assays taken from the shaft range from $43 to $75 per ton in silver. The ore is a blue sulphuret, and from appearances could be readily milled. About 5 tons of ore are on the dump, which has been picked over two or three times by former owners, and sampled 43¾ ounces per ton at the Kingman sampling works.

Chloride Camp.—The first car-load of ore shipped by miners from this district, via the Arizona and Pacific Railroad, came from this camp, which kept the lead in point of production, although but little capital has been invested.

The Schuylkill and Elkhart mines have a joint shaft and a whim. About fourteen men are employed on the two mines, and the production is very creditable for the small scale upon which they are worked. The ore from these two mines is shipped to Benson, and carried from 17 to 35 ounces silver and from 58 to 75 per cent. lead.

The "Eighty-four" mine, the second extension south of the Schuylkill, has a foot of galena assaying 23 ounces in silver and 55 per cent. lead.

The Pinkeye mine, formerly the Hancock, a very promising property, is being properly opened.

The Altata works two men and ships a car-load every two months, averaging 70 ounces silver and 20 per cent. copper.

The Enterprise ships a car-load of 100-ounce ore every six weeks, employing three men.

Numerous other claims are being worked and slowly developed, nearly all of them paying expenses of development work.

Several claims worked by chloriders produced in one month about 75 tons, most of it high-grade ore, giving as high as 250 ounces silver, thus bringing up the production of chloride for June to a little less than 300 tons.

The Rattler has been started at work after lying idle some time.

Work is also being done on the Queen Bee, on the summit of the chloride trail, and some $1,000 has been taken out.

The largest portion of the ores produced in Hualapai district is shipped to Pueblo, but that from the Schuylkill, Elkhart, New London, and Champion mines goes to Benson.

About 150 tons of ore are shipped from Kingman every week, all base, the chloride ore produced in the district being worked at the Cerbat mill.

Gold Basin district.—The Golden Clipper claim lies a few miles south of Potts Mountain. The ore is a copper-stained quartz, carrying free gold, the formation being in porphyry. The ore will average about $30 per ton in gold, with 10 or 15 per cent. in copper. The claim is a recent location, and but one assessment work has been done on it, yet there are fully 500 tons of ore exposed to view, a good deal of which is on the dump.

A copper discovery has been made 4 miles from the Harmonica mine, assaying $20 in gold and silver and from 30 to 40 per cent. in copper.

A new mill is about to be erected in this district by a Colorado company. An abundance of water has been found.

Maynard district.—On the Dean mine the work of connecting the tunnel and the main shaft for the purpose of ventilation is going on.

Peach Springs district.—Considerable interest is being manifested by owners of mining properties in this vicinity.

The ore of the Copper King is reported to have assayed from 40 to 80 per cent. copper and $15 to $16 silver, and the property will be developed by a San Francisco company. Some work has been done, cuts are made every 50 feet along the ledge, and men are also engaged in clearing a road to the mine. A ledge of copper and silver has been traced 650 feet in length, with a width of from 20 to 60 feet. The ledge is in plain view from the gorge of the Colorado cañon.

Hackberry district.—The Indian Queen Mining Company is the only mine in this vicinity that has shipped any silver bullion, except small quantities at odd times by prospectors and chloriders. It yields from $2,000 to $5,000 worth of bullion per week. In the gold mines located in Music Mountains ore continues to be found.

The hoisting works of the Hackberry mine, at Hackberry Camp, were destroyed by fire, together with the blacksmith's shop and a large quantity of mining timber. The boiler and pumps have since been repaired and put in good shape, and new hoisting machinery will be in position in a short while. There are twenty-five men at work on the mine. Work is being vigorously prosecuted on the upper levels, south of the main shaft, and some very fine bodies of ore have been brought to light. The mill is running on full time, and crushing from 15 to 20 tons of ore per day, nearly all of which comes from the Hackberry mine.

The promising prospects of this district are the Poland and Hamilton, Lottie, Sterling, Bullion, Pine Tree, and Kingston.

PIMA COUNTY.

Quijotoa district.—Work on the Bonanza mines has been prosecuted during the year with gratifying success, and the developments in many adjacent claims have disclosed promising indications that they cover valuable ore deposits. The mountains have literally swarmed with prospectors eager for new discoveries, and to do assessment work thereon, or to relocate claims where the necessary requirements of the law had not been performed. Four principal lodes extend through Mount Ben Nevis, the Peerless, Cholla, Emerald, and Josh Billings. The lithological condition of these lodes favors the supposition that immense orebodies are present and descend to great depths. The strike of the Peerless is northerly and southerly, and in this the lode resembles all the fissures and contact lodes of this continent that have been great producers. The Peerless carries the highest grade of ore, the Cholla and Emerald next, and the Josh Billings the lowest.

The Peerless is from 4 to 6 feet wide, rising up a great reef of solid ore on the very brink of the precipice and 300 feet below the top of the ridge. A deep cut has been run, from which ore has been extracted giving assays of $500 per ton in silver, with some traces of gold. Very hard rock was encountered during the summer in tunnel No. 1 of the Peerless, which became softer, however, and at a distance of 312 feet this tunnel cut the vein, showing a well defined foot-wall, dipping west at an angle of 68 degrees. The tunnel is now in a distance of 346 feet. A drift on the vein has been run 147 feet and will be continued south

until a point directly under the winze is reached, when an upraise will be started to connect with it. The winze is now down 150 feet, in favorable material, and good progress is being made. In tunnel No. 2 of the same mine a point has been reached where an upraise is to be started. Peer tunnel No. 3 is in 252 feet in a soft formation.

In Crocker tunnel No. 4 the north drift is in 200 feet, showing ore which assays from $39 to $200 per ton. Preparations are being made to commence cross-cutting, also to sink a winze and start an upraise in the tunnel. Improvements in working facilities keep pace with developments. Power drills have been introduced into the tunnels and are working satisfactorily. The company is erecting a mill of 100 stamps, having removed the machinery of the 80 stamp Consolidated Virginia mill from Virginia City, Nev., and the 20-stamp Harshaw mill to the base of the mountain, between the Peerless and Crocker tunnels. An automatic tramway is being built to the tunnels, a distance of three-fourths of a mile and at an elevation of 1,400 feet above the mill, which will transport the ore at a small cost. A brick kiln was put up, which has furnished all the brick necessary for the foundations of the air compressors and mill. A contract has been let to sink a two-compartment shaft in the valley for water, and the contractors are erecting machinery to advance the work. Pipe has been ordered to convey water from the shaft to the mill-site and compressor works.

The Cholla lode, west of the Peerless, cuts its north end through the Locomotive ground, Casa Grande, Chief, and Big Indian, and follows a parallel course to the Peerless lode through the Cliff, Cholla, Wedge, Combination, and Accidental mines. On these five claims, which compose the Cholla lode, running north and south along the western slope of the mountain, fine ore has been taken out. The outcrop of the ledge from the northwestern end to a point about 600 feet south of the Accidental mine is regular and strong. From a surface examination it seems to vary from 4 to 7 feet in width, and a cut at the south end shows a vein 5 feet wide, assaying $376 per ton in silver.

The Cliff, Cholla, and Wedge, as well as the Wadsworth, have been incorporated under the name of the Weldon Mining Company.

The Cliff and Cholla locations are directly west of the Peerless, and join the Wadsworth at the eastern line of the latter, as does also the Wedge.

The Combination and Accidental are south of the Cholla and west of the Crocker, Mountain Daisy, and Combination No. 1; the last two showing a continuation of that strong formation which is the most striking feature of the Peerless lode.

The Accidental has been incorporated by San Francisco parties.

The Josh Billings lode runs through the mine of that name, and also through the Wadsworth.

The Emerald lode is singularly located between two silver veins, and is considered by some as a very promising vein of copper ore; but, judging from its location in the midst of silver mines, placed there by a strange freak of nature, it is confidently expected by many that it will turn into a silver mine.

The Peacock is in the southern trend of the Emerald lode, and some good ore has been extracted from it.

A rich strike is reported on the Devon, a claim situated on the western slope of the mountain, immediately south of the Crocker. A well-defined vein of ore heavy with rich black metal, which can be traced a long distance, has been uncovered.

The Little Giant mine is situated on the south break of the palisade,

he top of Mount Ben Nevis, and on the same ledge as the so-called anza mines—distant from them about 3,500 feet—and is similar in racter of location to the Peer and Peerless on the north end. A e ledge crops out on the Little Giant ground similar in character he Peer croppings. Some of the assays give over 300 ounces of sil- per ton.

he Pima and Arlie companies own the ground located under the es of Mexican and Grand Prize, on an extensive ledge, distant at 3,000 feet from the Crocker ground. These properties promise ecome heavy producers.

he Edinburg mine is located about four miles from Mount Ben Ne- and joins the Emma mine on the north. The ore assays between nd $4 per ton.

he Bonita and the Iron mine, owned by the same company, lie close he Bonanzas. They contain a large percentage of gold. These es are to be developed at once.

overed Wells district.—A correspondent says of this district: "To north of the Covered Wells, only 10 or 15 miles from the Quijotoa es, and forming part of the same mountains, is a mining section of ch little mention has been made. The country rock is composed ipally of porphyry, syenite, quartzite, and limestone, cropping out ough the debris and drift covering the country. Among the claims ted, the most prominent are the Hardshell and True Blue, parallel ations. Considerable work has been done by the owners in develop- these claims.

A shaft is sunk on the Silver Aleck mine, to the north of the Hard- ll, 36 feet in depth, out of which has been raised 60 or 70 tons of now on the dump. Of this, about 30 tons are first class, averaging in silver and 20 per cent. copper. These ores consist mainly of e and green carbonates, with some red oxide and chloride. The ft shows a very strong vein from 3 to 5 feet in width carrying ore the way down. No hanging wall was found till near the bottom of shaft, where the vein is over 5 feet in width, with a fine gangue of ey matter on both hanging and foot walls. About 200 feet to the th, in a ravine, this vein shows the ore from 3 to 4 feet in width, from thence north it is covered by debris.

On the Hardshell location a shaft has been sunk this year 46 feet r the intersection of the Silver Aleck vein; in this shaft, at a depth 0 feet, a 3-inch vein of ore was cut, which gradually increased until he bottom of the shaft it is over 4 feet in width, giving assays from to $30 in silver per ton. Twenty feet east of this shaft is an open 40 feet long, showing an ore vein from 2 to 4 feet in width assaying in silver and 15 per cent. of copper. About 100 feet farther east two fts have been started on the width of the vein, about 20 feet apart in ore. Four hundred feet west another shaft is down 12 feet deep, re assaying $20 per ton, the vein cropping out over 60 feet in width, in contact with porphyry country rock.

On the True Blue one shaft shows ore about 10 per cent. copper and in silver per ton. These claims are situated in the foot-hills about iles north of the main range of the Quijotoa Mountains, about 5 es northeast of the Covered Wells, the nearest station on the Southern ific Railroad being Casa Grande, 50 miles distant.

The Silver Lining claim is situated 1 mile southwest.

The Bonanza mine is 1½ miles to the north and has a very large body zurite copper ore carrying a large percentage of silver.

Harry Wooten's mine, a mile from the Bonanza, yields some very rich

chlorides and sulphides of silver, and farther north and west are many valuable locations.

The Brittle Silver, situated about 3 miles south of Covered Wells, in the foot-hills on the eastern slope of Quijotoa Range, has a shaft about 40 feet in depth, the ores from which have been shipped to reduction works and have netted a handsome profit.

In the same mineral zone, and about one mile northwest of the Brittle Silver, is the Hard Luck. On this mine there is a shaft 50 feet deep, showing a 4-foot vein, which is regular from the surface to the bottom of the shaft. The ores in this mine are similar to the ores of all the other rich veins in the district, viz, soft chlorides, horn silver, stephanite, and antimonial sulphuret. Lack of water is the great hindrance to active operations upon these claims.

On the Sunrise mine, near Covered Wells, the owners are said to have struck a vein of rich ore.

The Jersey Lily has a shaft about 6 feet deep, and exposes a 2-foot vein of beautifully colored carbonates. The ore is rich in silver and lead.

Bullion camp.—Quite a little camp is growing up at the Silver Bullion mines, situated about 15 miles northwest of Quijotoa and 4 miles from Covered Wells. Ten men have been at work, and in three weeks have taken out almost enough ore to pay for the mine. There is a shaft 40 feet deep and a drift of 23 feet from which they have been stoping. About $7,000 worth of ore has been sacked. The vein is from 2 to 16 inches wide. Arrangements are now being made with Philadelphia parties to incorporate the mine.

The Lady Gay adjoins the Bullion mine, and the surface croppings are similar to the surface ore on the Silver Bullion."

The Papago Chief group are located 4 miles from Covered Wells, and the Indian Chief group about 5 miles from them, in the direction of Logan City. They are both owned by the same company.

The Papago Chief shows on top a vein 10 feet in width. The croppings are white quartz, assaying but a few dollars. In sinking a shaft at the east end of the claim, ore that assays $100 per ton was struck at a depth of 2 feet. The shaft is now down 40 feet, and is intersected by numerous rich feeders that assay from $100 to $200 per ton. A tunnel, near the west end, is now in 140 feet, and rich feeders are encountered that show higher grade ore as they approach the ledge.

The Silver Mountain adjoins the Papago Chief. A fine outcrop shows along the entire length of this claim. It is now opened by two shafts, one down 15 feet and the other 20 feet, both in good ore. It is an incorporated property, and is owned by parties in San Francisco.

The Iron Cap mine is situated about 600 yards south of the Papago Chief. The ledge crops out at a height of from 30 to 40 feet in places, and is well defined throughout the length of the claim, all giving fair assays. A tunnel is now in 130 feet. The formation cut in the last 60 feet was syenite and quartz, with streaks of porphyry, strongly stained with iron. This rock is all mineralized and will assay from $2 to $8 per ton. They will probably strike the ledge within 20 feet of the face of the tunnel. The west extension of the Iron Cap is called the Black Rock, and the east extension the Silver Moon. Another property has been opened by a 40-foot shaft and some rich ore found, ten to fifteen tons of which are now on the dump.

Half a mile south of Papago Chief are three or four valuable claims owned by Mr. Williams. Ten tons of ore from these claims shipped to San Francisco worked $400 per ton.

The Indian Chief Group is 2½ miles northwest of the Peer and Peerless. ıe principal mine in this group is the Indian Chief, on which the work development is being vigorously pushed by three shafts—two 10 feet d one 20 feet deep. The outcrop shows three distinct and well de- ed ledges from 3 to 7 feet wide. In places the veins crop out 10 feet ove the surface.

South of the Indian Chief are the Pima, Silver Belt, and the Artega ın claims—the latter opened by a shaft 20 feet, in good ore—and on the rth the Horn Silver, a well-defined ledge.

The Gold Deposit, worked for many years by Mexicans, is now being ırked by a shaft 20 feet in depth, from which an incline extends about 0 feet.

To the south of the Gold Deposit lies the Great Eastern, which shows ı outcrop of 5 to 15 feet wide. Assays show a value corresponding to ıe Indian Chief, with the same character of rock.

The Green Mountain adjoins the Great Eastern on the south. It is orked by a shaft, now down 20 feet, in good ore.

The Gold Belt lies northwest of the Gold Deposit, and is worked by shaft 8 feet deep, in ore of the same character as the Indian Chief.

The west extension of the Gold Deposit is the Young America, which s a shaft 15 feet in depth, all in ore that assays very high. Ledge ım 3 to 5 feet wide, which outcrops the whole length of the claim.

South of the Young America lie the Emma and Silver Star claims, joining the Great Eastern and the Green Mountain on the west.

One mile west of the Papago Chief is the Little Giant. This is opened a 40-foot shaft, in which has been found some very rich ore. From to 15 tons of this ore is now on the dump. Average assays, $500 to 00 per ton.

Two miles west of the above claim is the Chieftain, which is a very ɔmising property.

Gold placers.—Gold placers have been discovered about 9 miles rth of Logan, in two gulches named Homestake and Midas. The ɔund is limited in extent and has been covered by four locations of enty acres each, known as the Homestake, in the gulch of that name, d the Midas, Solid Gold, and Padre Lopez, on Midas gulch. There ɔ bars on Midas gulch 200 feet wide by 600 feet in length and from 5 15 feet deep, that give colors to every panful. Mexicans who have en dry-washing there in their crude manner, with wooden bowls, have en taking out from $1.50 to $3 per day. There is a good fall to the lches and a good natural dam—that is, a precipice at the lower end the Homestake claim that is almost 30 feet high, over which the tail- gs could be carried. Considerable work has been done on these claims dry-washing, probably about one-eighth of the gold having been ex- cted in this manner. The gold is of a rough appearance, showing t little wash.

In *Spring Gulch district*, Situated about 20 miles north of Quijotoa, e Robert E. Lee mine has a shaft 40 feet deep, showing a vein in the ttom fully 6 feet in width. The ledge is a contact vein between lime d porphyry, and is well defined by smooth and regular walls. The e is what is known as pyrostytpnite, carrying also carbonates of lead d some sulphurets. Work is being steadily prosecuted on the prop- y, and the ore body improves as depth is attained. The ore is free lling, and the vein is traceable on the surface for over a mile and a lf.

The Spicer mine is about 5 miles east of the Lee. The shaft is down feet, yielding some very rich sulphide ore.

Adjoining the Spicer on the south is the Maher mine. The ore from this claim is a chloride, carrying carbonates of lead, and runs from $90 upwards per ton, and is now being taken out for shipment. The vein is about the same as in the Spicer, and is incased in finely-formed walls.

On the Silver Jim a shaft is sinking, showing ore which assays $250 per ton.

Other promising claims here are the Louisa Byron and the Hidden Treasure.

Arivaca district.—The Tucson mine, the second extension of the old Hanselman mine, is about 6 miles from Arivaca. Two and one-half tons of unselected ore from the top rock was lately worked at the Arizona customs mill, being the lowest grade taken from the mine, and yielded $130.98 silver; gold, $17.86, giving a total of $148.84, being $59.53 per ton. The mine has a shaft 100 feet deep, with cuts and drifts aggregating 200 feet. The ledge at the bottom is 12 feet from wall to wall, with a 7-foot pay streak, not a pound of which will mill less than 50 ounces of silver. In the drift now being run on the 100-foot level there is a 3-foot stratum in the pay streak in which native silver and free gold are seen in considerable quantities. None of this grade of ore was included in the shipment from which the bullion was made, nor will it be sent to the mill. It will be carefully selected for shipment, and none but the lower grades worked. The owners of this mine are Messrs. Clark & Dixon.

Empire district.—The Total Wreck mine has, during the past year, developed large bodies of ore, the character of which is improving in the drift on the 440-foot level. The ore body is heavy and the vein richer than before. The mine has resumed operations.

The ore from the Wedge mine is of the same appearance and character as that from the Total Wreck.

Helvetia district is situated in the Santa Rita Mountains, 25 miles north of Tucson.

The principal mine is the Blue Jay, on which about 750 feet of drifting and tunnel work have been done. The main working tunnel, now in 400 feet, struck the vein 180 feet below the surface, and the ore from above is being taken out and stacked for reduction. The vein is 3 feet wide and well defined throughout; it is estimated that the ore will yield about $60 per ton. There are over 1,000 tons on the dumps, and the company's mill is making a daily yield of bullion.

On the east side of the Santa Ritas is the Narragansett, which has a vein from 18 inches to 2 feet on the surface and between 5 and 6 feet at the bottom. The average assay of the ore is $37 per ton. A streak of copper glance 5 inches wide made its appearance in the last work done that will assay between 45 and 60 per cent. One thousand feet of this ledge shows itself on the surface. There are 225 feet of open cuts, tunnels, drifts, and shafts.

The Omega mine was shut down for a portion of the year owing to litigation. When it was shut down there were 300 tons of ore on the dump and at the smelter.

Of the *Greaterville mining district*, Mr. P. J. Cayne says: "This district is situated about 45 miles southeast of Tucson, at the northern end of the Santa Rita Mountains, in low rolling hills, accessible by wagon at all times of the year. Excellent grass, good water, and some timber are found. The placers have been worked for 9 years, and during that time they must have produced half a million of dollars. The largest nugget taken out weighed 37 ounces. There are 30 or 40 men working here the entire year, who take out, on an average of $1,200 per man, all

with the rocker, not having sufficient water for hydraulicking or sluicing. They frequently pack the water over a mile in canvas sacks on burros.

Gold has been discovered and mined over a radius of 4 miles. A cement formation underlies the gravel, and so far no shaft has been through it, although one was sunk to a depth of 175 feet, showing gold all the way down but not in paying quantities. A dry washer and concentrator was introduced during the summer with apparent success, but the fall rain set in before arrangements were completed.

The most promising mines in the district are the Florida and Copper King, which are located about 7 miles from the placers. Over 300 feet in tunnels, shafts, etc., have been run on these mines. The deepest shaft is down 70 feet, with a cross-cut of 110 feet. The mines are situated on a steep hill-side with a good spring of water below and plenty of good timber. The ore will assay 15 or 20 per cent. in copper, and from $30 to $40 per ton in silver.

The Yuba is one of the oldest locations in the district. It has an incline shaft down 100 feet, and some ore taken out was hauled by wagon to Yuma and then shipped to San Francisco, giving a net profit of $90 per ton. The accumulations of the yearly assessment work is on the dump, and will assay $200 per ton in silver.

The Santo Domingo is located about 2 miles south, on a limestone ridge. It has a shaft 100 feet deep, and has been opened along the vein in spots or pockets. There are over 100 tons of ore now on the dump that will assay from $50 to $130 per ton in silver.

The General Hancock has a shaft 100 feet in depth, and the vein uncovered is 500 feet in length, showing a good strong ledge from 2 to 3 feet wide, carrying galena and gray copper. One ton of this ore reduced at the Charleston mill yielded $160.

The Eureka, 1 mile south of the post-office, is a good-sized ledge, the croppings, in places, being from 10 to 12 feet wide.

The Monitor, an adjoining claim, has an incline 36 feet deep.

The Wisconsin has a shaft 40 feet deep.

The Shamrock, 1 mile west, has an incline 70 feet deep, with 50 tons of ore on the dumps. The ore is galena and chloride, showing assays as high as $280 per ton.

The Quebec is an old location, having shipped a few tons of ore before the railroad was built through the Territory.

The Vulture ledge has a varying width from 18 to 24 inches. Assays run from $57 to $250 per ton.

The Pawnee, Ten Broeck, and Pioneer, three adjoining mines, are 1 mile west from the above.

On the Pawnee a 50-foot shaft was sunk and a tunnel 100 feet in length. Nine tons of ore were shipped to Benson, which yielded $40 per ton in silver. The result was unsatisfactory, as the assays showed values from $100 to $250 per ton. As the principal owner of the mine was killed about a year since, no further shipments have been made. The ore is galena, gray copper, and chlorides.

The Eagle, 1 mile northwest, has an incline 50 feet deep, and about 20 tons of ore are on the dump, some having been shipped. This is a good location with plenty of wood.

The Evangeline, located 4 miles north, is a gold-bearing ledge. It has only been prospected along the surface, where it crops out 500 feet in length. The ledge is from 1 to 3 feet in width, and quartz from any part of the ledge shows free gold. Assays have been made showing values as high as $1,000.

The general prospects of the district have not materially changed during the past four years; about the same annual production of bullion, and the same amount of assessment work being done upon the claims. There are extensive copper mines within a radius of 6 miles.

The placer mines of this district, discovered in 1874, are yielding about $1,500 per month.

Tyndall district.—On the Darwin most extensive developments have been made, and with the opening of spring work on it will be renewed. The shaft is down 50 feet, and at a depth of 15 feet the first cross-cut was made, and a ledge 12 feet in width was exposed. At 50 feet a similar cross-cut was run with a like result as regards width and quality of ore. The average ore assays about $70 per ton. The owners purpose to sink 50 or 100 feet more, and then cross-cut and drift at given distances.

Work on the Hyde Park is progressing favorably. The ledge, on top, is 20 feet wide. The tunnel now being run is in on the ledge 70 feet, with good pay ore on both sides and in front. The average run of the assays is from 22 to 47 per cent. copper, and from $16 to $80 in silver.

Harshaw district.—The famous Alta mine, over which there has been so much litigation, has been leased by Judge Fuqua from W. B. Horton, agent of the Alta Company, and work resumed. The machinery put in by the Benson Smelting Company has been taken out, and the lessee is chloriding for the reason that it requires a good deal of machinery to pump the water out and work the deep shaft.

A small force of men are working in the Rattlesnake mine, and taking out excellent ore. This is the oldest mine in the district, and was worked one hundred and twenty-five years ago by the Mexicans.

Pima district.—The Silver Blende mine is located 10 miles southwest of Tucson. A shaft is being sunk on the mine and is down 35 feet. The shaft has been in a 14-foot ledge all the way down. A cross cut at the depth of 35 feet exposed another ledge of fair ore. Assays of the best ore gave $62 in silver and a large percentage of lead. Mill working will yield $25 per ton.

The Fortune, situated about 12 miles southwest of Tucson, has about 100 tons of ore on the dump. The rock is gold bearing and averages from $17 to $20 per ton. The developments have been very limited.

Amole district.—Buena Vista and Good View, two claims in the vicinity of the Silver Blende, are being worked.

The Little Watson, which adjoins the above mines, is also in process of development. The ore is of the same grade and value as that in the other mines in the same neighborhood.

Washington district.—The mines now being worked in this camp are rich in carbonate ore carrying lead and iron; and the ore-bodies near the surface are easily mined. The ore is delivered at the smelting works at $2.50 per ton. There are large deposits of fine iron ore within a radius of from 3 to 6 miles; wood selling at $4 per cord, charcoal at 20 cents per bushel, and coke is delivered at $7 per ton, brought from Crittenden on the railroad.

Flux mine.—Work is progressing finely on this mine. Mr. Salsbury, of the Benson Smelting Company, now has possession, although the mine has been for more than two years in litigation. He has built a road up the side of the mountain at an expense of $5,000 and put up houses in the vicinity of the mine. He has about twenty men at work and is shipping an average of one car-load a day.

The Mowry Company has resumed work, and the diamond drill will be brought into use in this mine.

Holland Smelting Works were purchased by H. B. Elder on the
ebruary, 1884. They were erected by the Holland Silver Mining
ny, and were run for a time without success. Mr. Elder is now
ıg the ores successfully with only one furnace which has capacity
ons per day. He is now running 10 tons per day, turning out 3
bullion, which give 220 ounces of silver and $1\frac{1}{16}$ ounces of gold.
Ohio mine is extensively developed. It produces fair ore, 20 per
ad and 30 ounces of silver being about the average.
ore of the Grasshopper carries about the same quantity of lead
Ohio but more silver.
Old Holland mine, from which the bulk of the ore used has been
runs 25 per cent. lead and 36 ounces silver. The vein is said to
eet wide.
Blanco district.—The Esperanza mill has been completed during
r and is now running. The contract work on the 230-foot tunnel
Esperanza mine has been completed; and, although showing in
ast where work was left off better than any time previous, devel-
; was discontinued.
Montana Company owns a fine property about two miles from the
nza. A tunnel 250 feet in length is in ore, with a ledge at that
0 feet in width, the ore from which will average from $25 to $30
in silver and gold. Wood is abundant, and it is thought water
had by sinking wells.
Franco-American has several tons of ore on the dump.
Choctaw group has a large body of low-grade ore.
Yellow Jacket mine, three miles west of Oro Blanco, is a large
ll-defined contact ledge, with a shaft 100 feet deep and several
xposing large bodies of ore.
e Blue Wing a cone of ore was struck that widened out, filling
ire shaft, so that at a depth of 110 feet the width of the ore is
own, as it had not been crosscutted.
bi district.—The Cababi Consolidated Mining Company is making
shipments of ore.
Iam Gibbins has discovered and located the Nugget mine, which,
et from the surface, shows a vein 10 feet wide of green quartz
says well in gold and silver.
Goethe mine has a shaft down 80 feet. The pay streak varies
to 9 inches, assays going $600 per ton in silver.
Aaron Mason states that the outlook for the Fernandez mine is
ing. The ore is copper-silver glance, and will work 45 per cent.
and 100 ounces of silver per ton. There are two shafts, 130 and
in depth, and about 70 feet of levels. The ledge is well defined,
e shafts show ore all the way down. Three shifts of men are
ıting the work of development.
r Hill district.—Mr. Gates, superintendent of the Abbie Water-
ine, reports that work has been begun in that mine. The ore is of
rade and in abundance. The work of development has been
ompleted, and the force is piling ore on the dump for shipment.
be some time, however, before they will begin shipping, as the
road to the mine is not completed. A large force of men are now
k on it.
s district.—In relation to the Gunsight mine, Mr. R. C. Pearson

present company has struck into a body of very rich ore 7 feet
I went through the property carefully, and find the Silver Girt
ıaft is down 380 feet; first level 200 feet, north drift 147 feet—
re—south drift 240 feet, with 180 feet stopes; ore averaging $23

per ton. Gunsight, old shaft, 240 feet deep, with 31 feet of ore exposed, averaging $60, without assorting, and still in ore. The first level is 100 feet, with 130 feet of stoping opened 7 feet wide, averaging $75; second level, 180 feet of stopes opened, averaging $60. They have about 60 men working in the mine and mill, and are taking out plenty of ore. I would judge they have got five or six thousand tons of ore on the different dumps. The mill of the company has a capacity for working 48 tons of ore per day. They also have first-class steam-hoisting works, assay, retort, and laboratory buildings, a large blacksmith shop, magazine, tool-house, office, store, boarding-house, and a number of cottages for their miners. They have three wells, with well-houses and cottages at the wells. A three-inch pipe connects the wells with the mill. Four-fifths of the ore in these mines is free milling and one-fifth smelting. The mines owned by the company are the Gunsight, Silver Girt, and Eastern, all of which are patented."

The Ide Gold and Silver Mining Company are making all necessary arrangements for the immediate development of their group of mines, which are situated seven miles above Willow Springs. Considerable work has been done in the group for the past two years, but the mines have never been thoroughly developed. However, in one a shaft is down 60 feet, and is below the water level. Assays have shown a fine quality of ore, which is composed of gold, silver, and galena. This ore will work $40 per ton or upwards.

In addition to these claims the same company has mines at Gunsight, which are considered equally as fine as those which are at present being worked at that place. In one of the mines the shaft is down 200 feet, and the outlook is encouraging. It is closed now, however, and operations will not be resumed until further developments are made in other mines which are on the same vein.

PINAL COUNTY.

Pioneer district.—The following report of the superintendent of the Silver King mine will show the production and work done during the year 1884:

"The surface improvements at the mine have been as follows: The erection of a small storehouse for iron and steel, the extension of blacksmith shop 15 feet, the widening of engine house 11 feet for new machinery, the construction of a new entrance road to the premises for the ore teams, and the reconstruction of the engine-room which contains the engine furnishing power to the shops. Two new 54-inch by 16 feet steel boilers, supplying 100 horse-power additional power, have been set up adjoining an old steel boiler of the same dimensions, thus giving in the battery of three nominally 150 horse-power, and at present steam requirements, allowing a relief boiler to contend with the scaling water. A single 18 by 30-inch Ingersoll air-compressor has been set in place, and furnishes power for seven air-drills in the mine, and at the same time additional ventilation, while its capacity is sufficient to run three or four more air-drills, or a diamond drill of about 15 horse-power.

"The necessary air tanks for the surface and the mine, with the extensive pipe connections, were set in place at the same time. A much-needed 14-inch swing engine-lathe was added during the summer, and a 5 by 16-inch steam hammer has been placed in the blacksmith shop, enabling us to make many forgings to better advantage than we have heretofore been able to do. An ore bin of a capacity of about 20 tons has been erected for supplying the ore teams with a special class of ore.

"The work in the mine has been confined almost entirely to the 500, 600, and 700 levels.

"On the 500 level there has been a small enlargement of the sill floor since my last report, although the dimensions I then gave of greatest length and breadth remain about the same. During the year the second floor has been about worked out and the third floor opened.

"The total amount of ground extracted on this level amounts to 66,000 cubic feet, of which 28,900 cubic feet have been taken out this year. The stopes of this level look very well, and have been for some time supplying the greater quantity of our amalgamating ore.

"On the 600 level there has been no work done during the year until quite recently, when the sill floor was opened out considerably and the shaft station remodeled and retimbered. The sill floor is now 87 feet long and 60 feet wide, and about 35,000 cubic feet of rock have been extracted. It is in a good character of ore on all sides and the stopes promise well.

"The work on the 700 level during the year has been very extensive. Of the eleven floors, stoping has been done on the second and the eighth, and the sill floor has been extended on the west side, an extreme width of 25 feet, and an extreme length of 55 feet, in a fine body of ore having principally quartz and heavy spar as a matrix. This ore body reaches to the fifth floor of the level, up to which point it will be stoped out, it having been worked out above that point. The third floor of this level is the only one which has not been extended any during the year, while the sill, second, fourth, fifth, sixth, seventh, and eighth have been considerably enlarged, and all the ground extracted on the ninth, tenth, and eleventh floors has been done during the year. A small volume of ground still remains to be taken out on the sill floor, while the second, third, fourth, fifth, and eleventh floors offer considerable stoping ground yet; the first four in the quartzose-baritic ore body. The level has been almost completely filled up with waste rock to the ninth floor, and from that point to the sixth hundredth a large amount of waste has been filled in, in the shape of bulkhead pillars, to support the mine. Much embarrassment and inconvenience has been experienced the past year in this level by the rotting of the old sill timbers and the consequent crushing and settling of the great volume of waste, carrying with it the timber system of the central portion of the level, and throwing out of line the timber sets in the upper part of the level. The sorting of ore in the mine does not now produce enough waste to fill up with, so the extra quantity required has to be sent down from the surface. The slacking of rock in place which has been for a long time exposed to the action of warm, moist air, has added to our inconvenience. These difficulties, however, are being obviated, and there is no change in daily production. The extreme length of the sill floor of this level remains at 235 feet, while the greatest width is 130 feet. The volume of ground extracted during the year has amounted to 457,609 cubic feet, and the total quantity excavated amounts to 1,115,378 cubic feet.

"The 800 level remains the same as a year ago, with the exception of a winze sunk from the sill floor of the 700 level.

"There has been a somewhat appreciable change in the amount of water in the mine, undoubtedly due to the unprecedented rainfall of last winter and spring, although the increase does not embarrass us any. During the year 922,826 gallons have been hoisted, or an average of 76,902 gallons per month. During the first three months of the year the average was 53,905 gallons per month, while that for the last nine months (or since the cessation of the heavy rains) has been 84,567 gallons.

"The consumption of cord-wood at the mine was 1,303 cords, costing $12,297. On the 1st of August the price was reduced $1 per cord.

"The improvements during the year at the company's mill have been

the introduction of the Brush and Swan systems of electric li
the former with excellent results; the erection of a substantial n
pump house over the 6 inch drilled well, to replace the one de
by last winter's flood; the construction of a low masonry dam,
long, across Queen Creek, that advantage may be had of all th
that flows in the bed of that stream; and the sinking of a 12-inch
well, to a depth of 208 feet, which at the last test made of its flo
1,400 gallons per hour. During the driest season we have h
creek dam gave us an increased supply of 400 gallons an hour.

"The amount of ore hauled to the mill was 20,570 tons, and t
opened with a reserve in the mill yard. The total amount of ore
was 22,342 tons, which has yielded 51 shipments of concent
averaging about 11½ tons each, and aggregating 577.98 tons.
shipped was about 2.59 per cent. of that crushed, the charge
ratio being due to the character of ore met with in certain parts
700 level in the early months of the year. The average assay of
as per daily assays, was $43.12, and that of the tailings, simil
tained, was $5.66. Of the silver contents of the concentration,
cent. was in the form of ductile or native silver, and 49.1 per
contained silver in the various argentiferous minerals. The co
tion of cord-wood at the mill averaged 6.1 cords per day, at a
$0 per cord.

"In the early part of last May the milling facilities were in
by leasing the 5-stamp amalgamating mill of the Windsor Cons
Mining Company. Since then the mill has been run on our qu
baritic ore, of which we have large quantities in the 500, 600,
levels of the mine, and which cannot be advantageously concer
The ore is dry-crushed, roast-chloridized, and amalgamated. E
hundred and nine and sixty-two one-hundredths tons have been
and treated, having an average value of $46.38 per ton. The
value of the tailings to the close of the year was $9.33, but up to
part of December was much less than that figure, the proportio
crease being due to mechanical causes, chiefly the inability to
mullers and shoes in the pans on account of delays in freighting fr
roads. The chlorination is satisfactorily effected with 2¾ per cent.
and the average consumption of quicksilver per ton of ore trea
1.32 pounds. The consumption of cord-wood is 4 cords per da
per cord. The chloridized ore is readily amalgamated, and the pr
treatment has worked satisfactorily, and can be applied success
any class of ore at present known to exist in our reserves in th

The secretary's report shows the receipts and disbursements
been—

DR.

To balance on hand January 1	$
To sale of bullion	
To sale of concentrations	4
Total	5

CR.

By sampling and assaying	
By expenses	
By insurance	
By freight	
By merchandise, timbers, and lumber	
By dividends Nos. 44 and 45	
By superintendent's drafts	3
By balance on hand December 31	
Total	5

The Monarch of the Sea Mill and Mining Company, whose property lies some 1,500 feet north of the Silver King mine, have been at work for some time developing.

At the Eureka mine a winze, which was sunk from the mouth of the first tunnel by the Windsor Company to a depth of 26 feet, has been continued about as much farther into the supposed foot-wall and a large ore-body exposed, with a vein nearly 5½ feet wide. About 50 tons of this ore are on the dump, which assays close upon $100 per ton. The ore has been worked heretofore in considerable quantities in the Windsor mill, in Wheeler & Doran's mill, and in the Old Baldwin mill, and has yielded well. From the Baldwin over $7,000 was shipped in concentrations. The ore is free milling.

Casa Grande district.—The Vekol maintains its position among the chief mines of the district. Its richer grades of ore are being shipped to Argentine, and the ore continues to yield a net profit of $300 per ton. The lower grades are thrown on the dump and treated by the 10 stamp mill which has recently been erected. About 45 men are employed in the mine.

The Christmas Gift and Copperosity mines have been purchased by parties in Cleveland, Ohio.

In the Orizaba a discovery is reported of a pay streak about 4 feet in width in the incline. The ore consists of anglasite, chlorides and sulphurets, eighteen sacks of which indicated an assay of $350 per ton, and 5 tons netted $2,000. Beside the ore shipped they have over 600 tons of second-class ore on the dump that will mill from $50 to $100 per ton.

The Trout and Atchinson copper mine has been pronounced the largest copper mine in Arizona. The ore-body has been uncovered for a width of 110 feet and a length of 700 feet, and is known to extend to a depth of 112 feet. The latter fact has been determined by a shaft 112 feet deep. The bottom of the shaft is still in solid ore. Several other shafts have been sunk on the claim, one to a depth of 50 feet with cross-cuts at the bottom, all in ore. There is also an incline, 25 feet in depth, all in ore. The ore carries a sufficient per cent. of lime and iron to flux it, and the grade is good, judged by sample assays. The developments on the extension of this mine show a continuation of the ore-body through the length of seven claims. The mine lies out on the mesa and crops out at one point only. The remainder of the lead or body, whichever it may be, is covered to a depth of several feet by a cement.

In the Julius mine a rich strike has been made at a depth of 50 feet in the shaft now sinking on the vein. The shaft has been driven down on the foot-wall, and has shown pockets of ore all the way down. The vein matter has shown a gradual solidification from the surface to the bottom of the shaft, which has just penetrated an ore-body rich in chlorides and sulphides.

The Susie has a small but well-defined ledge. A shaft has been sunk 25 feet, showing about 8 inches of high grade carbonate ore, which assays 162 ounces per ton in silver and about 45 per cent. of lead, and also a good average in gold, the gold occurring on the foot-wall, which is distinctly visible. This claim is about 1 mile east of the Copperosity, and in the vicinity of Jere Fryer's mammoth ledges.

Owl's Head district.—The mill leased by the Jessie Benton Consolidated Mining Company has been running steadily for some time upon ore carrying native silver, antimonial silver, horn silver, and what is locally known as "black metal," the latter giving, in specimen assays, from one hundred to several thousand ounces per ton, from the By

Chance and Lone Will mines. The ore is being worked up to
to 95 per cent., and produces fine bullion. Some trouble has bee
rienced from a scarcity of water, but at a depth of 40 feet in
the shafts they struck a true fissure vein with water enough for
mill.

They are working several men on the Jessie Benton mine, s
what has heretofore been considered rebellious ores to Benson,
Southern Pacific Railroad, the waste being reserved for wor
their mill when they get possession of it. It is now believed t
Benton ore can be amalgamated by the Elmore plan of treatme
or nearly as closely as that of the Lone Will group. This comp
several valuable prospects, notably the Benton, with ore the full
of the location, and several shafts, varying from 20 to 90 feet in
and the Desert, upon the ore of which they have run their mi
eight months, the latter having an incline shaft 162 feet deep, w
ounce ore in the bottom.

Several other locations in the camp were worked.

The Arcade, with a 2 foot vein at the surface, increasing to 3
a depth of 25 feet, is being developed.

The Alamita carries ore similar to the Benton. At the weste
of the claim is the Silver Cross shaft, so called from a specim
this shaft having a beautiful cross of native silver upon it. Th
is now about 40 feet in depth, and upon the same belt as the Lo
group.

The Bullion has a 5-foot vein of $60 free-milling ore. Abo
worth of work has been done on the claim. Three tons of pic
are to be worked in the Dyer mill.

The Eureka mine in the Limestone Belt, on Queen Creek, is r
as showing a 6-foot vein of high-grade ore.

This district, up to the present time, has not created much sti
mining world, the only mill being the Jessie Benton, the cap
which is only 5 stamps.

Mineral Hill district.—The Specie Paying mine is looking wel
incline, which connects with the main tunnel at a depth of 110
all in ore from the surface down. This alone opens a large am
stoping ground, to say nothing of the ore-bodies in the tunnel.
there is now sufficient ore in sight to keep the mill running fo
time, and it may be said that the development of the mine has
commenced. The ledge is from 20 to 50 feet wide, clean cut, and
defined. The ore is delivered from the dump to the ore bin by a
self-acting tramway. The 5 stamps of the mill drop at the rat
revolutions per minute on unassorted ore from the incline, and
to pulp from 12 to 14 tons every twenty-four hours. The ore w
to 85 per cent., and gives a good average.

In addition to their own mine the company has obtained a nine
working bond on the Alice, the north extension of the Specie
which it is developing. Three shafts have been started, one
north cropping, one on the south, and one near the center of th
The latter will be a double compartment and the main workin
All of them are sinking on the vein, and will be connected by
different depths. This plan of development will open the min
best advantage and insure good ventilation.

A very rich strike was recently made in the south cropping
claim. It consists of a pay streak, from 4 to 6 feet in width, lyi
to a spar vein, on the outside of the discovery vein. An open
been run along this streak for a distance of 40 feet, and shows

the way, some of which is very rich, containing black sulphurets and chloride in malleable form. The whole body of ore uncovered will probably average $60 per ton at the mill.

A tunnel on the Timekeeper has penetrated the wall a distance of 50 feet. In the incline on this claim, 75 feet below the surface, a large body of ore has been uncovered, and the tunnel is designed to penetrate this body 50 feet below the bottom of the incline.

Mineral Creek district.—A remarkably rich strike is reported to have been made in the shaft now being sunk on the Poorman lead. This claim is one of a group of twelve recently bonded by the Ray Copper Company for $12,000. Shortly after securing the bond Superintendent Curtis had work commenced on the Poorman, in the shape of a large shaft. At a depth of 10 feet the shaft penetrated an ore-body wider than the former, and composed of red oxide and native copper, containing but very little waste. The shaft has now reached the depth of 30 feet and shows no diminution of the ore-body. It would be a low estimate to place the average of all the material taken out of the shaft at 70 per cent. copper.

The Victoria is a gold discovery, located about 2½ miles north of Riverside. A tunnel is in 50 feet, all in ore; a shaft has been sunk in the tunnel to a depth of 50 feet. The average of the ore taken from the tunnel and shaft is from $30 to $36 per ton. The ledge is lime-capped, and crops on the surface for a distance of from 50 to 60 feet. The formation is porphyry and granite. Messrs. Elder and Nieman have 35 claims located in the group with the Victoria.

Bloodsucker district.—A Chicago company has been at work on a number of claims for some time in this district, and have developed a vein of ore about 14 feet wide, giving a general average of $17 in gold and $16 in silver per ton.

Old Hat district.—The owners of the Southern Belle gold mine are working a force of men upon their property. They have several hundred tons of ore upon their dumps, some showing free gold. Several months' run with the Ada 5-stamp mill demonstrated the free character of the ore and its value.

About 12 or 15 Americans and Mexicans are working placer claims in the Southern Belle gulches. The placers are what are known as "rocker diggings."

YAVAPAI COUNTY.

Peck district.—Mr. T. J. Eaman, of Alexandra, furnishes the following account of the mines in this district for the current year:

"In the vicinity of Alexandra the mines of importance are as follows:

"The Peck mine, owned by the Peck Mining Company of San Francisco: During the year the main working shaft has been sunk 200 feet, and levels run north and south 100 feet. It has produced and milled at their mill about 150 tons of ore, yielding nearly $15,000, besides shipping 10 tons of ore to San Francisco, which yielded about $10,000.

"The Black Warrior, owned by the Black Warrior Mining Company of New York, has produced and worked for the year 200 tons of ore, yielding $25,000. The main shaft has been sunk 100 feet, making a total depth of 350 feet, and 500 feet of levels have been run, two of which show a 12-foot ledge of sulphuret ore. Work has been suspended for the present on account of insufficient hoisting machinery.

"The Three Sisters, owned by A. Morrill, of New York City, has been the best-paying mine in this section, and has produced during the past six months $85,000, $40,000 of which was paid as profits to the owner.

The mine is opened by a tunnel 250 feet from the surface, and runs along the vein 650 feet. From this level ore has been extracted above and below. The ore is a chloride and sulphuret, and has averaged $250 per ton in silver.

"The Oriental, owned by Messrs. Helen and Ensign, is a new prospect now being developed, and gives promise of good bodies of ore. At present it is being prospected by a tunnel.

"Many good prospects in this section are being worked, but the high price of reduction, and the heavy freight rates attendant upon shipping ore to Benson, San Francisco, or Pueblo, prevent work upon any mines not producing ore worth at least $150 per ton.

"All of the above mines are silver bearing. No gold is found in paying quantities. These mines have been worked for the past five years, and are within a few miles of Alexandra, at which post office the mine-owners and managers receive their mail.

"The North Cougar, owned by Messrs. Bond, Hayden & Brittingham, has produced during the year about 200 tons of ore, which was worked at the Bradshaw Basin mill, and yielded about $12,000. The ore is galena and black sulphurets of silver, of an average value of $60 per ton. Work is suspended on account of the ore being too low grade.

"The Black Warrior mill is the only mill at present in operation in the district. It has been running upon ore from the Black Warrior and Three Sisters mines, and small lots of custom ore produced by prospectors. The average grade of ore for the section has been $150 per ton.

"The bullion yield for the year has been about as follows:

Black Warrior	$15,000
Black Warrior, high-grade ore shipped	10,000
Three Sisters	85,000
North Cougar	12,000
Miscellaneous, estimated	10,000
	132,000

Tiger district.—The Tiger mine has been worked during the summer by chloriders, and has produced a few tons of high-grade ore, which was worked at the Black Warrior mill.

The Lane was purchased some months ago by the company represented by Mr. T. J. Eaman, and under his supervision has made a fine record as a bullion producer. A 4-stamp mill was started on the ore from this mine on the 12th of June. In two months from date of starting 300 tons of ore were crushed, which yielded between $50,000 and $60,000. From August 1 to the 19th the bullion product has been $26,000. The ore mills about $240 per ton in silver.

Bradshaw district is about 50 miles south of Prescott, in one of the largest mountain ranges in Arizona. Wood and water are abundant and the climate is excellent. The Gray Eagle, Bond & Hayden mine, and the California are well-known ledges.

The Rapid Transit is a promising claim. At a depth of 30 feet in one shaft the ore-body is over 3 feet in width, average assay across the ledge being $125; equal in gold and silver.

From the Minnehaha about $1,000 in gold has been taken, and about the same amount from the Esperanza.

Tip Top district.—The Basin mining camps are in the Tip Top district, lying on a straight line 1½ miles from Humbug, on the same lode, some of the veins being located the entire distance. The Basin is on the east side of the ridge and rich in silver. The miners in Basin endeavor to make the properties pay as they are being developed. A few

ısignments to San Francisco paid, and some ore worked at Gillett d a dividend, but the chloriders were unable to keep out of debt til they commenced shipping ore to Benson. They handle no ore ıt pays less than $100 per ton.

The following claims have been more or less developed by their own- :

The Silver Hatchet has two shafts connected by a tunnel that show 0-inch vein of $50 ore.

There are two claims on the Crescent lode, one of which has a 112-foot ıft that has yielded about $18,000 worth of high-grade ore by select- ; the best; and the 5-foot vein on the other averages about $40 per ı. While from the Comet, from an 80-foot shaft on a 20-inch vein, ; ore sells in Benson for $400 per ton.

On the Hasner claim, near these mines, the mountain is tunneled for feet along the vein, and the ore raised to the surface through a shaft. ɔout ten tons of $400 ore have been taken out.

The old Barnum mine is yielding high-grade ore.

On the Trilling the prospects are good.

On the mine now worked by the Smithline Brothers developments ; showing a fine property. They have a tunnel run into the hill 65 ;t along the lode, at the end of which a 65-foot shaft penetrates high- ıde ore for 50 feet. The ore from this shaft yielded $5,500. From ; bottom of the shaft they have tunneled the vein under the above ınel in high-grade ore for 140 feet. The lower tunnel filled with ter last winter. They then commenced a perpendicular shaft, to ike the lode, across a ravine and went down 77 feet, and it is yet y. From the bottom of the shaft they ran a 20-foot tunnel back along -inch vein, some of which will run very high. About 119 feet more ll connect the two tunnels, and machinery will be erected for reducing e water preparatory to stoping.

The Crosscut lode runs north and south through the district, cutting right angles all other lodes which run east and west.

A shipment of 5½ tons of ore from the Texas mine, near the old Tip p, was recently sent to the Benson smelter and netted the owners 53 per ton, or a total of $1,952. The charge for treating the ore was 0 per ton.

Humbug district lies on the west side of the ridge separating it from e Basin, and is rich in gold.

The Saint Louis and Yavapai Mill and Mining Company have erected 10-stamp mill. The stamps weigh 1,000 pounds each. The engine is 40 ırse-power, and there is also one large Blake rock crusher. Total ɛight of machinery, 80,000 pounds. The company constructed a road ɔm Frog-Tanks to Humbug, on which to haul this machinery. They ɪn seventeen claims and are reported to have made a rich discovery ı the lower Humbug, in the hill just east of Thompson's Camp. This ll has been known for its rich mineral deposits for over fifteen years, ıd two claims, the Road Runner and Gold Bunch, have not only yielded rge returns in gold, while being worked by the arrastra process, but ıve produced some very fine gold specimens. The new discovery is a w hundred yards below the Road Runner and on a parallel vein. It a well-defined lead, and so far seems to be regularly mineralized in- ead of containing only pockets of gold ore. The ledge is 1 foot in idth, the quartz iron-stained, and in the center freely honey-combed, ıd assays up into the thousands. A 5-stamp mill and concentrator ɪe in course of erection two miles from here at Farling's Camp. On ɔso Creek and its tributaries placer miners are making good wages.

Hassayampai district.—Nearly the whole surface of this district is covered with timber. The altitude is from 5,500 to 8,000 feet. The formation is granite with diorite and chlorite slate, traversed by porphyry dikes; the veins generally running in a northeasterly direction. The silver produced has come chiefly from the Buzzard and the Dosoris mines, little more than assessment work having been done on the large number of remaining mines. As nearly all the veins carry both gold and silver the need of proper machinery for concentrating, sorting, and smelting the ores is greatly felt, and few of the mines here will have much development until such works are erected within available distance.

From the Dosoris, 72,000 pounds of ore have recently been sent to Colorado to be treated. The mine is not a large one, but it has for years been a constant producer of rich silver ores.

A strike of apparently a large body of rich ore has been encountered in the tunnel of the Buzzard and Raven mining claims, near the Dosoris mine. The claims are owned by the Dosoris Company, who have run a tunnel, striking a ledge at a depth of 150 feet where this body of ore was found. The indications are that the mines will prove a very valuable property. The ore is said to average $125 per ton.

The Bonanza Grigione mine is about 1 mile east of the Dosoris. The ore is of a bluish cast; carries between $200 and $300 per ton in silver and $40 in gold. It is situated so that short tunnels strike the ore several hundred feet below the surface. The ore is to be sacked and shipped.

The lessee of the Holmesite mine has taken out 20 tons of second-class ore, which, it is said, assays $325 per ton. He has also about 4 tons of first-class ore which will yield much higher.

The Silver Trail, Blue Dick, and Mark Twain mines are being developed.

The Dunkirk mine is rapidly developing into a valuable property.

The vein in the Alta mine is said to be 30 feet wide, some of its ore ranging from $130 to $1,000 per ton.

The Snow Clad mine is located upon the Senator vein, three-fourths of a mile from the mine of that name.

Along the vein there are some twenty surface openings, the deepest being 9 feet. All of this work shows the vein in place. Between the diorite and country rock there is a distance of from 20 to 30 feet, which is filled with porphyry in the center, and has an ore vein upon each side, and more or less ore is found in the porphyry. Upon the west side of the porphyry is a vein of quartz, which averages 2 feet in width. In testing this ore it was found to contain from $3 to $20 per ton in free gold. At one place there are 3½ feet of carbonates and 2 feet of quartz. The average tests of this carbonate ore show 20 per cent. lead and $37 silver per ton.

On the Cash mine there are three shafts from 17 to 30 feet in depth, and some smaller surface openings. The ore contains from $20 to $30 gold and from $10 to $20 silver per ton. Another ore chute, about 200 feet in length, shows 2 feet of ore. About 50 feet west of this is another pay chute, about 200 feet in length. East of the main vein there is another vein upon this location which has not been prospected, but shows some gold and silver.

The Esmeralda fissure vein, is prominent, cropping out boldly, and extends for a long distance. Granite is on the foot-wall, and porphyry on the hanging wall. The vein carries gold and silver, the base being chloride of silver. The vein is well defined, the ledge being uniform

and showing no faults or breaks. The general course of the vein is northeast, with a dip to the north of 45°. Assays of its ores ran from $100 to $500 per ton, and the ores are easily reduced. Mill runs have given from $70 to $150 in precious metals and the concentrators yield even more than this.

Agua Fria district.—Mr. Van Name reports regarding the mines in this district:

"The Swiss Girl, owned by Julius Baumann, of Prescott, has a shaft down 50 feet, showing 5 feet of ore said to average 25 per cent. in copper and several ounces in silver.

"The Nonpareil, owned by Dugan & Co., has a shaft down 70 feet, showing 1 foot of ore said to average 30 per cent. copper and 20 ounces in silver."

Other mines in this vicinity show good prospects, but of them no reports have been received, except of the Lawrence, owned by Lawler Bro's & Hickey, who describe their property as follows:

"The Lawrence and its first north extension, the Manzanita and Red Bluff, are situated 20 miles east of Prescott, and about 60 miles south from the Atlantic and Pacific Railroad, with a passably good road from the mines to the latter point. A shaft sunk on the Lawrence mine, 65 feet in depth, shows a body of mineral 4 feet wide from the surface to the bottom of the shaft, containing silver and copper. Recent tests made of the ore gave from $160 to $317 per ton in silver, and an average of 17 per cent. in copper. The shaft is sunk in the center of the claim, and the ore is traceable 750 feet each way from the shaft. As yet no work has been done on the Manzanita and Red Bluff, but they show good ore on the surface."

Jersey district.—This new district, including a part of the old Hassayampai district, is situated about 13 miles from Prescott and about 2 miles above the Hassayampai bridge. The parties interested with Mr. Flint in the mining properties there have erected a fine steam arrastra mill. They own three properties, the Grosvenor, Delaware and Fremont, all of which show fine veins of gold ore averaging from $15 to $20 per ton, the veins being never less than 5 feet in width, and in some places 30 feet. The mines are tolerably well opened, the greatest development, however, being on the Grosvenor, which has been prospected to a depth of 200 feet. The main shaft on this mine is situated at 7,666 feet above the sea level, being probably the greatest altitude of any mining shaft in the Territory.

Silver Mountain district is situated in Silver Mountain, 8 miles south of the Tiger mine, 4 or 5 miles west of the Lane mine and 4 miles south of Minnehaha Flat. Recent developments along Humbug Creek and about the base of Silver Mountain are attracting attention.

Weaver district.—About the first placer mining that was done in Yavapai County was at Weaver, 40 miles west of Prescott. The diggings were discovered in 1862, and have yielded a great deal of coarse gold. A great many Mexicans and some Americans are working around Rich Hill where the big pieces were first picked up. The gravel in gulches and on table lands on the west side of Antelope Mountains contains plenty of gold, but water to wash it is generally scarce.

The Van Annen mine has a vein rich in sulphurets.

The Marcus ore was free milling on the surface, and to a depth of 100 feet, when it turned into sulphurets that are unusually rich, yielding $2,000 per ton.

The Leviathan mine, near the above, has an ore body measuring 425 feet across at the western end. A tunnel cuts the vein in the center

from the west at a depth of 100 feet from the croppings. There are numerous cuts and shafts on various portions of the property, all exposing bodies of ore which mill without sorting $20 per ton in gold. In addition to this average of ore, there are streaks and bunches of ore that yield by arrastra process many thousands per ton.

Turkey Creek district.—The foremost mine in this section is the Pine Spring. The native and horn silver ore now taken from the 70-foot level mills $2,000 to the ton. A 3-foot body of ore is reported to have been discovered on the first extension of the Pine Spring.

A large ledge has been discovered a half mile from Bueno Station, resembling in characteristics the ledge of the Pine Tree mines.

The 10-stamp mill of the Arizona Mutual Silver Mining Company has, until recently, been worked on custom ore and tailings, but additional fixtures have been put up, with the expectation to keep the 10-stamps employed on the ore of the Arizona Consolidated mine. The water has been pumped from this mine, in which is an 8-foot ledge of solid ore. The main shaft is down 213 feet, with drifts on the 100, 150, and 200 foot levels. Expensive hoisting works and buildings have been put up.

The Silver Eagle, another property of this company, adjoins the Arizona Consolidated, and is an equally promising claim.

On the Morning Glory, also belonging to this company, a rich discovery was recently reported. At a depth of 7 feet gold ore was found, going from $1 to $10 per pound, the vein being 92 feet in width.

The Franklin Company have the whim up on the Union shaft, and will commence sinking and drifting immediately. Some of the best ore of the district has been taken out of this mine.

The Yankee Boy is shipping high-grade ore which will work over $800 per ton.

On the Longfellow, high-grade ore has been found 140 feet below the surface.

Walker and Lynx Creek district.—Mr. C. Y. Shelton, of Walker, furnishes the following information:

"No changes of much note have been made since last year. Prominent mines have received the attention required by law.

"The Solano is a quartz vein or lode situated on or near the Bald Mountain. A number of tons of its ores have been treated during the year, and the following statement gathered from its owners.

"One shaft 30 feet in depth, vein 14 inches, assays $55 gold, 10 per cent. lead, and 25 pounds per ton in quicksilver. Owing to the mercury, the owners state that it is impossible to work the ore profitably by the usual process for working gold ore.

"The only product of lode mines during the year was obtained by miners and prospectors in a rude way and will not exceed $6,000, gold, while the placers produced from $12,000 to $16,000.

"The machinery of the Kimball mill has been put in place on Lynx Creek, and the mill started with some 300 tons of excellent gold ore. The prospects are very flattering. The mill has 10 stamps with a capacity of 20 tons per day.

"The Shoe-Fly mine is on Lynx Creek, about 1½ miles from the Kimball. The ledge is small, but very rich. The mine is owned by Robert Casad, who is an experienced mill-man, as well as miner, and he expects to get about $400 per ton from the ore taken out, of which he has now about 10 tons. It is his intention to take this ore to the Lowell mill to work it.

The Lynx Creek placers are the property of Governor Tritte and the

Murphy Brothers. During the last winter, it is said, nearly $20,000 gold was taken out by the Lynx Creek Hydraulic Works. Parties in a position to know, estimate that during the last sixteen years over $500,000 in fine gold have been taken out of this creek. It is learned that the owners of this property contemplate expending a considerable sum of money during the coming season in improvements, in the way of building reservoirs, ditches, &c., by which the supply of water, which runs to waste in winter, can be stored and made available for working the placers a large portion of the year."

Of *Big Bug district* Mr. Van Arman writes as follows:

"There have been no producing mines in this district this past season, and but very little except assessment work has been done.

"Mr. Robert Schofield is erecting a 10-stamp mill for concentrating ores from the Poland, Hamilton, and Bullion mines owned by parties interested with him. The mill will be ready for operation early the coming season.

"The Pine Tree and Mountain Boy, owned by the same parties, each have a 50-foot shaft with 2-foot ledges, said to average from $40 to $50, gold and silver.

"On the Lottie, in which the writer has an interest, we have drifted, at a point 60 feet below the surface, 150 feet on the vein, which shows a width of from 12 to 18 inches, and the ore yields from $50 to $125 per ton, in gold and silver.

"The Sterling and Kingston promise well."

Black Hills district.—The mines owned by the United Verde Copper Company, at Jerome, have proven a series of surprises to the owners. The properties were purchased and worked as copper properties, but as they have been developed they are found to contain silver in large quantities, in fact so large that the silver is sufficient to pay all the running expenses of the mine, leaving the copper as a profit to the owners.

Superintendent Thomas writes that another rich strike has been made in the Wade Hampton, one of this company's mines, on a drift from the 100-foot level 25 feet north of the last body of ore struck on the same level. The extent of it had not been ascertained, but the first samples taken assayed 20 per cent. in copper and rich in silver. In every direction that drifts or cross-cuts have been run, ore-bodies have been encountered. The furnace has run up to October 1, 1884, 289 days, and Superintendent Thomas gives the product by assays at the mines 4,396,951 pounds of refined copper, 237,951 ounces of silver. Estimating the average price of copper at $250 per ton, the gross yield of copper amounts to $548,500, and the silver at its coining value, $1.29 per ounce, amounts to $307,655.

Some important strikes have lately been made in the Carlisle. On the 300-foot level a body of ore has been encountered which shows up free gold. On the 400-foot level the edge has been tapped and an immense body of ore encountered.

On the mines of the Copper Belt Mining Company considerable work has been done this summer.

Groom Creek district.—The Groom Creek mill is at work on gold-bearing quartz.

The shaft on the Chicago mine is down 175 feet in ore bearing gold.

Mr. Clarke is running his mill on ore from the "110 mine."

The promising mines now being developed in this district are the Happy Boy, Benjamin, Adel, Berry, Heathen Chinee, Homestake, Palace, Lone Star North, Lone Star South, Surprise, Nevada, Old Put,

Gazelle, What Cheer, Golden Star, Black Hawk, Elmira, Gray Eagle and Julia, all bearing gold and silver, and having veins of ore varying in width from 6 to 30 inches.

Black Canyon district.—The American Tramp mine is opened by a shaft 120 feet in depth, showing a 7-foot ledge with 4 feet of ore.

YUMA COUNTY.

Silver district.—Mr. Crawford is at present working three mines in this district, the Engineer, Emma, and Silver Plume, with flattering prospects. The ore is what is known as galena and silver, and a portion of it runs from 150 to 300 ounces to the ton. The ledge is well defined, ranging from 10 to 30 feet in width, and is nearly all paying ore.

Messrs. Gilchrist & Downey are taking rich ore from the Remnant, which they propose to ship to San Francisco and from the proceeds add improvements to their machinery for concentrating purposes.

The Black Rock and Pacific mine, the Red Cloud and the Rover have produced during the year, and the Hamburg and Princess are promising prospects.

North Silver district.—The Clip mine and mill are producing to their full capacity.

The Alberta, an extension of the Clip, is looking well, and the workings in the ore bonanza of the Clip are now only 80 feet from Alberta. The last makes a good showing of high-grade ore.

In the Klara a vein of 6 feet of white carbonate has been uncovered.

The Peacock is a full claim and is situated within a half mile of the Clip. The ledge is from 10 to 15 feet in width, and is exposed to view the entire length of the claim. The country rock is granite and porphyry, and the pay streak full 4 feet of solid ore. But little work has been done on the mine, but that little has demonstrated the fact that a large body of ore exists in this claim.

Castle Dome district.—It is reported that an important discovery of gold placers has been made here. The diggings are back of the Castle Dome range, about 50 miles from Castle Dome landing and 80 miles southeast of Ehrenberg. The placers are about 10 miles from water and are being worked with dry washers. The pay dirt is from 4 to feet thick, and most of the gold is found in the gulches, although fair prospects have been found on the mesas. The gold is sharp and jagged of a deep color and heavy, and from its appearance indicates that it came from ledges near by, as specimens are both large and rough, not rounded as they naturally would be if coming any great distance. The discovery is of importance, and with the steam dry-washers, now being worked at the old La Paz diggings, it is expected to add largely to the gold product of this section.

In the vicinity of these placer mines a discovery has been recently made of a ledge of ore varying from 10 to 20 feet in thickness and full 2 miles in length. The ore assays high in gold and silver.

Centennial district.—The mines in this district are looking well and much prospecting is reported. The Alps group, consisting of eight locations, have a slate formation and ore similar to that in the old Vulture mine. The facilities for obtaining sufficient supplies of wood and water are excellent. Every gulch below the ore bodies contains considerable placer gold which is flat but coarse.

Plomosa district.—The Mathilde Mining Company is producing large amount of copper bullion, which is shipped to Baltimore. A company is trying to secure the Minerva Hill property and also the

Halleck and Goodman mines at Rawhide. If they succeed they will increase their facilities for working. There is considerable work being done up and down the river on all the copper claims, notably at the camp of Messrs. Mack and Macy, between the reserve and Empire Flat.

Big-Horn district.—The Big Horn group of mines are situated in Yuma County, near the Bill Williams Fork, and are owned and operated by a San Francisco company. The company own a number of valuable claims and will work them in a thorough and systematic manner. The ore averages 35 per cent. copper, 80 ounces silver, and $20 gold. Ore of that value is very profitable to work.

Humbug district.—Chloriders continue to take out good silver ore, which is shipped to Benson.

One of the mines discovered by Don Miguel Salcido, near New Water, was evidently worked many years ago. In prospecting, an old shaft was uncovered nearly filled with sand rock. After clearing out the *débris* to a depth of 15 feet an old metate was found, upside down, and underneath it a stone pestle. On examination it proved to have been used to pulverize the ore found in this ledge, which is a decomposed quartz, running very high in gold. The ledge is to be thoroughly prospected and worked by an arrastra.

Mr. Péterson, while prospecting the Carga Muchacho range, came upon a small streak of very rich gold rock. He is now down about 40 feet, and the vein, which at first was very narrow, appears to be gradually widening. The formation is solid and the quartz of very high grade, giving promise of paying a large profit when worked by the Arrastra process.

Estimate of Mr. A. M. Lawver of the bullion production in Arizona during the calendar year 1884, *classified by counties.*

Counties.	Gold.	Silver.	Total.
Cochise	$181, 825	$2, 130, 601	$2, 312, 426
Graham	35, 000	.....	35, 000
Gila	10, 000	100, 000	110, 000
Maricopa	433, 200	58, 000	491, 200
Mohave	30, 000	235, 223	265, 223
Pima	98, 456	226, 695	325, 151
Pinal	48, 587	772, 129	820, 716
Yavapai	59, 721	1, 002, 399	1, 062, 120
Yuma	35, 000	300, 000	335, 000
Total	931, 789	4, 825, 047	5, 756, 836

CHAPTER III.

CALIFORNIA.

Although injunctions closed many hydraulic mines in the cen counties, the total gold production of the State was diminished less t had been anticipated, and notwithstanding the reduced yield of c $500,000, California still retains its rank as the largest gold-produce the United States and the richest gold field in the world.

The diminished output occasioned by the stoppage of hydraulic r ing in many localities was compensated to some extent by increa activity in quartz mining and the use of new methods, especiall drift and river-bed mining. Quartz mining has an advantage over o classes in requiring less water and in permitting operations in this S to be prosecuted throughout the entire year, unimpeded by snow ice.

Drift mining is carried on chiefly along the Pliocene channels. principal workings have been at Forest Hill and San Juan divi together with some localities in Placer and Nevada Counties, in western portion of Sierra and some parts of Butte and Plumas Coun By this process not only have some old hydraulic mines been succ fully worked, but many new mines have been brought to a produc state. The mines restrained from hydraulic operations are those wh *detritus* is discharged into tributaries of the San Joaquin and Sa mento Rivers. On other affluents of these streams, where no injur the property had occurred or was anticipated, many mines have continued operations, notably at Howland Flat and La Porte.

The attention of miners has to some extent been diverted from draulic mining in these gold fields to the extensive gravel deposit the northwestern counties, for the successful working of which Trinity, Salmon, and Klamath Rivers afford excellent facilities. volcanic matter overlying these deposits carries no indurated cem and but little pipe clay, while the neighboring mountains furnish ample supply of water. The rivers flow through deep cañons (a which the farming land is out of danger from hydraulic *débris*), discharge their waters into the ocean through the Klamath, w has no bay or harbor at its mouth; consequently no injury can re from the filling up or shoaling of navigable waters. River-bed mi is still carried on in the older districts, but the beds in many cases ing been nearly depleted, the business has fallen almost exclusi into the hands of the Chinese, who, diverting the water by wing-d uncover and extract the gold from only a portion of the river bed.

The past season has been favorable for this class of mining; the w remaining at a low stage until late in the season, permitted operat to be continued longer and gave larger "clean ups" than in prior y

A new method of diverting the river from its bed is being tried, such success as to promise a prolonged extension of this class of mi

A tunnel is cut through the principal elevations at points along the gold-bearing streams, through which, at two stages, the waters flow, leaving a long stretch of river-bed bare and in favorable condition for working.

A tunnel on the Feather River, on which work has been constantly prosecuted during the past two years, and which will take at least two years longer to complete, is the most extensive enterprise of this kind.

Quartz mining has become the leading branch of the mining industry of California. This has been accomplished largely through constant improvements in machinery and the increased knowledge in the methods of working ores. Several new enterprises have been started up and some old quartz mills reopened, making many additions to the number of bullion-producing quartz mines, while those heretofore in operation have, as a general thing, kept up their customary production. In some parts of the State, especially in the districts of Homer and Tioga, quartz mining has fallen off, but in others a considerable advance is noted.

A large number of auriferous quartz discoveries have been made during the year in Calaveras, Shasta, Sierra, Inyo, Nevada, and Kern Counties. Sierra has developed into one of the richest quartz regions of the State. Notably among the reported quartz discoveries are the New River deposits of Trinity County, which have been, however, but partially developed. Many of these show high-grade ore, and are found in geological formations which indicate permanency. The surrounding conditions are excellent, as the country is well watered and heavily timbered.

Prior to the discoveries in San Bernardino County three years ago, silver mining in California was prosecuted with but little success; but since then it has steadily increased in importance. During the past year the recorded mines have kept up an increased supply of silver bullion, while many new properties have been located.

The silver mines of California have, during the past three years, turned out about $5,000,000, which has been produced with the aid of but little capital, the mines in most cases paying the expenses of development. The silver output, which four years ago was less than $1,000,000, has increased to $3,000,000, being now about one sixth of the entire gold and silver production of the State.

The deposits of silver in Alpine, Mono, Inyo, and Shasta Counties have as yet been but partially explored. The great argentiferous belts, the deep hydraulic banks of dead-river channels, the auriferous bluffs and beach of the sea shore, and the deep-lying basins of the mountains, hold rich resources, which will reward the patient explorer when more accessible ore shall have been exhausted.

In addition to the great wealth of gold which California continues to pour in the world's coffers, and her vast reserves of silver only now beginning to yield their wealth, other useful minerals and metals abound in a variety probably unsurpassed, and as many of them have an influence on the production and refining of the precious metals a brief mention of them may not be inappropriate.

The production of quicksilver has fallen off during the year, owing to the great decline in price, but will rapidly increase if the present advancement is maintained. It is estimated that over 100,000 tons of coal were mined during the year, chiefly from the mines of Mount Diablo, Ione, and Lincoln. The very low price of copper has kept the production of that mineral at a low point during the past twelve months. Some 80,000 gallons of petroleum were produced, and some lead and antimony were found. Salt of fair quantity is made by solar evapora-

tion from the extensive deposits on the bay of San Francisco, an borax industry has also been depressed, owing to the low price. chrome, manganese, asbestos, and tin are found in small quant while clay, asphaltum, soda, gypsum, and graphite abound.

The dividends paid by California gold and silver mines durin year are reported to have been as follows:

Name of company.	Number of dividends.	A
Birdseye Creek	1	
Bodie Consolidated	6	
Bonanza King Consolidated	6	
Bulwer Consolidated	1	
Derbec Blue Gravel	6	
Idaho	13	
Mount Pleasant	1	
Oro Grande	10	
Plumas Eureka	2	
Plymouth Consolidated	12	
Sierra Buttes	2	
Standard Consolidated	3	
Syndicate	6	
Total	69	1,

I have estimated the production of California for the year 18 have been: Gold, $13,600,000; silver, $3,000,000; total, $16,600 which appears to have been obtained from the several counties app mately as follows:

Counties.	Gold.	Silver.	T
Alpine	$5,000	$4,000	
Amador	2,000,000	2,000	2,
Butte	680,000	.....	
Calusa	1,500	.....	
Calaveras	485,000	.....	
Del Norte	100 000	.....	
El Dorado	575,000	16,000	
Fresno	80,000	.....	
Humboldt	115,000	.....	
Inyo	80,000	82,000	
Kern	100,000	5,000	
Lassen	50,000	.....	
Los Angeles	40,000	11,000	
Mariposa	180,000	.....	
Merced	6,500	.....	
Modoc	60,000	.....	
Mono	1,000,000	285,000	1,
Nevada	2,950,000	5,000	2,
Placer	720,000	.....	
Plumas	900,000	.....	
Sacramento	270,000	.....	
San Diego	65,000	5,000	
San Bernardino	32,000	2,550,000	2,
Shasta	320,000	30,000	
Sierra	1,140,000	.....	1,
Siskiyou	475,000	.....	
Stanislaus	40,000	5,000	
Trinity	500,000	.....	
Tulare	70,000	.....	
Tuolumne	310,000	.....	
Yuba	250,000	.....	
Total	13,600,000	3,000,000	16,

The collection of the statistics of this State was placed in char Mr. E. F. Burton, superintendent of the San Francisco mint, and compiled mainly under the direction of Mr. A. M. Lawver. Th views, however, of many of the counties, written by gentlemen con

ant with the mining industries of their respective sections, for which due credit has been given, have been freely used, and in part or whole inserted in the appropriate place.

ALPINE COUNTY.

The following review of this county was prepared by Mr. Cyrus Coleman, of Markleeville:

Mining for the precious metals in Alpine County during the past year has been unusually inactive. There are five mining districts in the county—the Alpine, Silver Mountain, Monitor, Mogul, and Hope Valley.

Alpine is the central district, and in it Markleeville, the county seat, is located. The only claim actively prosecuted in this district during the year was the Illinois-California. During seven months' work the tunnel was extended 100 feet, the rock being principally granite and intensely hard. The tunnel did not reach the lode.

Silver Mountain district adjoins Alpine on the southeast. The Ole Nelson was the only claim operated during the year, except for assessment purposes. The lode is in granite and carries gold and silver. The improvements consist of about 80 feet of tunnel, a house, and an arrastra, which were built during the fall, and commenced operations about the 1st of January, 1885. Silver Creek is the post-office of this district.

Monitor district adjoins Alpine on the northeast, and *Mogul* adjoins it on the north. These two districts are divided at a point in the mineral belt about three-quarters of a mile north of the town of Monitor, the boundary line running east and west. The general course of the great mineral bearing veins is north and south, and the prominent mines developed thus far in the Mogul district are lying contiguous to those developed in the former district. The Colorado No. 2 is located on Monitor Mountain, about 900 feet above the town of the same name; the south side of the mountain is steep, and at its base is the road leading from the town to Carson City, Nev. This is considered the most valuable mining property in the district, but owing to disagreement between the owners has not been worked during the year.

The main tunnel of the North Colorado was extended 50 feet during the year, but no valuable developments were made.

The Last Resort was steadily worked during the year, some 200 feet of tunnels and drifts were run, and several rich feeders were cut with flattering prospects.

A number of other claims were worked to the extent required by law to hold them.

Mogul district.—The Stella mine was not worked during the year.

On the Polaris an incline was sunk 75 feet, following a very rich vein, containing gold, silver, copper, and lead. A considerable quantity of ore is on the dump, but owing to the heavy flow of water the owners were obliged to shut down. This claim is located on the main mineral belt, and adjoins the North Colorado on the north.

About 300 feet of drifts were run on the Orion during the year with very flattering results, but owing to financial distress it is not worked at present.

In *Hope Valley district*, situated west of Alpine, on the headwaters of the West Carson River, a large number of mines have been located, of which the Altura is the most prominent; but very little prospecting was done in 1884.

AMADOR COUNTY.

Within this county, from Plymouth to Middle Bar, on the Mokelumne River, a greater number of productive mines are now being worked than can be found in the same area elsewhere. The facilities for working these mines are favorable, as none of them lie in deep gulches, but are all accessible by good wagon roads.

Jackson district.—The rich streaks or spots of ore are worked in a hand mortar. The ore of the Mammoth mills yields on an average $27 per ton, and the ledge is 5 feet wide.

At the Wetzler quartz claim, near the Mammoth, a small vein of very rich ore was struck. It has the same characteristics as the rich quartz met with in the Mammoth, carrying arsenic and other base metals, as well as a liberal supply of gold. The strike furnishes proof that gold bearing quartz seams are plentifully scattered over the region around Middle Bar. The claim is now being developed.

Messrs. Nevills and Nicholls, the owners of the Moore mine, expect to start work at once on that property. The intention is to sink an entirely new shaft, the old one having caved to such an extent as to render its repair out of the question.

The Saint Julian, near Middle Bar, has a narrow ledge, which is very rich in places. It has a tunnel in more than 200 feet. The eastern wall of the tunnel shows numerous stringers of quartz from one to three inches wide, all going down with a strong easterly dip. The wall, roof and floor are sprinkled with rich black ore. From this point small veins of white and apparently barren quartz are seen on the east wall to the face. Here the vein widens to a foot or 18 inches, and is plentifully freighted with sulphurets of a yellow color. Free gold is occasionally met with in the quartz taken from the face. The average ore mills $40 per ton. This, like the Mammoth, is rich in its pockets, but the permanency of the ledge has not been determined.

Middle Bar Tunnel.—The big tunnel at Middle Bar has encountered several stringers of quartz, carrying the same character of heavy black metal, a large proportion of which is free gold, which is met with in the upper tunnel of the Mammoth mine. This fact is regarded as proof positive that the rich pockets which have made the Mammoth so famous extend to great depth. An idea has prevailed that these pockets did not reach more than 200 or 300 feet from the surface, but experience has proved this notion without foundation. The head of the tunnel is in about 1,700 feet, and the main body of pay quartz is likely to be reached within the next 100 or 150 feet.

The Lighthouse mine has resumed operations. The ore is of low grade milling $6 per ton; but as the ledge is large, the prospects of its being a paying mine are good.

In the Marlette a body of rich ore was struck lately, but how extensive is not known. This claim is located in the vicinity of the famous Mammoth and Saint Julian mines, and the quality of ore is similar to that found in them.

A contract has been let for running 100 feet from the upraise in the Amador Queen mine, at Hunt's Gulch.

The Bright Quartz mine will be started up soon.

A discovery is reported to have been made in a mine at Fort Ann, on Dry Creek, which is likely to rank with the richest ever made in the county. The ledge is 2½ feet wide, and the softer portions of it are paying from $1 to $2.50 per pan. In this vicinity rich float has been dis-

covered for years, but this is the most extensive discovery ever made there.

The Turntable is located in *Pioneer district*, and is being worked on a limited scale. A tunnel has been run into the hill, tapping the ledge at a distance of over 50 feet beneath the shaft. About 30 tons of ore have been taken out, which it is believed will pay fairly. The ledge varies from 1 to 4 feet in thickness, and the rock is of a rit bon character.

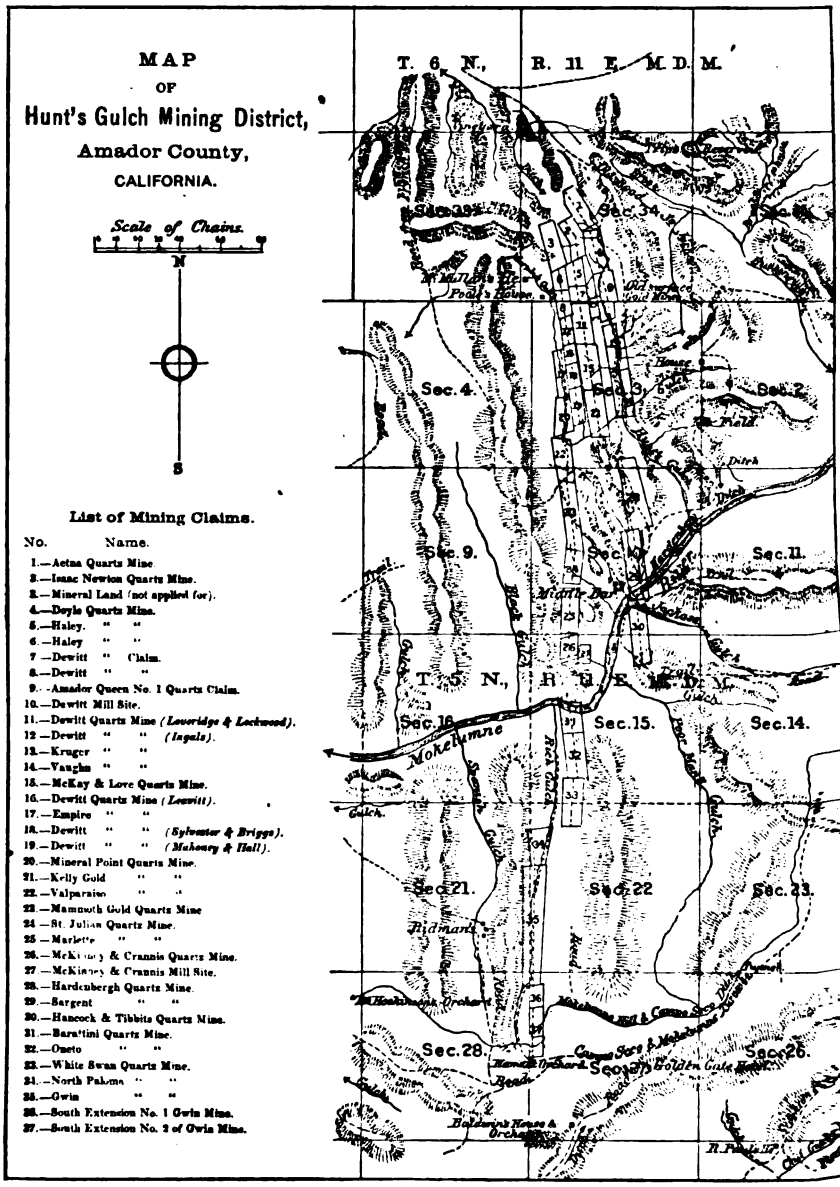
The owners of the Saint Louis mine, near Clinton, are crushing rock by arrastra process. The have a tunnel run about 100 feet into the hill and have struck the ledge at a depth of 100 feet from the surface. The ledge is from 3 to 4 feet wide, and has paid an average of $16 per ton. They can crush about half a ton per day, and are not prepared to work on a larger scale until they get it more fully opened up. At the McKenny and Cranis quartz mine two men are employed. A shaft has been sunk 100 feet, and a drift run west 15 feet, with indications of striking pay ore soon.

The Amador Queen mine is located in Hunt's Gulch, on what is known as the east vein of the Mother lode. The claim is 1,500 feet in length, and shows croppings the entire length. It has an incline shaft 205 feet in depth, with a cross-cut showing a ledge 27 feet in width; 200 tons of ore worked from this ledge yielded $7.85 in free gold, and 4 per cent. of sulphurets, which assayed $120 per ton.

The Amador Queen consolidated is located on the west vein, on what is known as Murphy's Ridge. This mine has been worked since 1852, but to no great depth, owing to the flow of water. In 1880 Mr. James Morgan purchased several adjoining claims, making a total of 4,300 feet on the lode, and has driven a tunnel into the ground tapping the ledge 412 feet from the surface. During the past season about 900 feet of tunnel drifts have been run, the tunnel having cut several veins, varying in width from 3 to 21 feet. Two very fine chutes of ore have been encountered carrying free gold and about 20 per cent. of arsenical sulphurets. Five hundred tons of ore crushed yielded $10.25 per ton.

The company owns a 20-stamp water power mill, which it is expected will start about the 15th of February, 1885, with two concentrators for saving the sulphurets. This mine bids fair to become one of the great bullion producers of Amador County.

The Hardenburgh mine, situated at Middle Bar, which has been lying idle for many years, is believed to be a good property. It was closed down owing to litigation, but it is generally understood that work will soon be resumed.


MAP
OF
Hunt's Gulch Mining District,
Amador County,
CALIFORNIA.
Scale of Chains.
N
S
List of Mining Claims.
No. Name.
1.—Aetna Quartz Mine.
2.—Isaac Newton Quartz Mine.
3.—Mineral Land (not applied for).
4.—Doyle Quartz Mine.
5.—Haley. " "
6.—Haley " "
7.—Dewitt " Claim.
8.—Dewitt " "
9.—Amador Queen No. 1 Quartz Claim.
10.—Dewitt Mill Site.
11.—Dewitt Quartz Mine (Loveridge & Lockwood).
12.—Dewitt " " (Ingals).
13.—Kruger " "
14.—Vaughn " "
15.—McKay & Love Quartz Mine.
16.—Dewitt Quartz Mine (Leavitt).
17.—Empire " "
18.—Dewitt " " (Sylvester & Briggs).
19.—Dewitt " " (Mahoney & Hall).
20.—Mineral Point Quartz Mine.
21.—Kelly Gold " "
22.—Valparaiso " "
23.—Mammoth Gold Quartz Mine
24.—St. Julian Quartz Mine.
25.—Marlette " "
26.—McKinney & Crannis Quartz Mine.
27.—McKinney & Crannis Mill Site.
28.—Hardenbergh Quartz Mine.
29.—Sargent " "
30.—Hancock & Tibbits Quartz Mine.
31.—Barattini Quartz Mine.
32.—Oneto " "
33.—White Swan Quartz Mine.
34.—North Pakoma " "
35.—Gwin " "
36.—South Extension No. 1 Gwin Mine.
37.—South Extension No. 2 of Gwin Mine.
T. 6 N., R. 11 E. M. D. M.
T. 5 N., R. 11 E. M. D. M.
Sec. 33
Sec. 34
Sec. 35
Sec. 4.
Sec. 3
Sec. 2
Sec. 9.
Sec. 10
Sec. 11.
Sec. 16.
Sec. 15.
Sec. 14.
Sec. 21.
Sec. 22
Sec. 23.
Sec. 28.
Sec. 27
Sec. 26.
Mokelumne
Ridman
Road
Ditch
Gulch
Creek
Head
Hancock & Tibbits Quartz Mine
Golden Gate Mine
Baldwin's House & Orchard

The Valparaiso mine adjoins the Mammoth on the north and has a tun-
el of 100 feet run upon it; also an open cut of 500 feet or more down
ie hill to near its northern boundary in Murphy's Gulch. This cut ex-
oses the ledge for a long distance and some rich ore has been taken
it.

The Kelly mine, which has been idle for the past two years owing to
tigation, is expected to soon start up. This mine has about 1,500 feet
tunnels, a 20-stamp mill, and all the necessary equipments for a first-
ass mine.

A concentrator for the saving of sulphurets in gold ores has been in-
ented by Theron Reed, of Jackson. The machine has been attached
the 1-stamp mill of the Saint Julian, at Middle Bar, and practically
sted with results so satisfactory as to leave no room to doubt its suc-
ss. It consists of an endless revolving belt similar to the Frue, the
lt being made of canvas. Instead of a flat surface the belt is concave,
e depression being two or three inches near the center. The motion
sembles that of a miner's pan in panning out, the most effective motion
r settling gold or sulphurets. On reaching the point of greatest de-
ession the sulphurets are concentrated at the bottom, the water and
nd are discharged at the side, whilst the slow-revolving belt draws
e sulphurets over the other end, where they fall of their own weight
are washed off in passing through water underneath. Attached to
e machine is what is called a cut-off. This is simply a sluice-box, pro-
ded with a shake like the belt. The discharge from the battery first
sses through this box. At the end is a slot, the opening being suffi-
nt to admit only from one-half to two-thirds of the pulp. By the time
e pulp reaches this slot the sulphurets are at the bottom and pass
rough the opening to the concentrator proper, whilst a large propor-
n of the lighter stuff passes over and is finally disposed of. In this
y the bulk to be treated by the concentrator is very materially re-
ced at the outset.

Amador City.—Improvements are being made at South Spring Hill
ne, among them a new track from the mine to the mill, which has
en completed, and is now in running order. The iron car, drawn by
e horse, delivers 3 tons of ore a trip. A force is putting up new
isting works. The new engine is on the ground; also, 2,000 feet of
w flat wire rope, and the new hoisting machinery is expected to be in
nning order in the course of two or three weeks. A new dump is also
ing constructed, capable of holding 400 tons of ore. The last clean-
at the mill was made on the 2d of November, and paid as usual, the
tal yield being about $4,000. This mine has a 6-foot ledge which
lls $21 per ton, not including sulphurets. There is every indication
its being a permanent mine, and that it will equal in value the
mous Keystone.

The working of the Keystone mine was begun by private parties in
50. It was transferred to the present company in January, 1866, and
s been continuously worked to the present time. The shaft was sunk
ring the past year 225 feet on the incline. No levels have been opened
yet from the bottom of the shaft. The greatest vertical depth at-
ined is 1,000 feet, and on the incline 1,308 feet. There is a 40-stamp
ter-mill, which is equipped with steam-power machinery for use in
se of the failure of a supply of water. The average width of vein is
feet. The ore mills $10.50 per ton in gold. The cost of mining is
.25, and of milling $1.35 per ton. The average of ore crushed per
amp every 24 hours is 2½ tons. There are 110 men employed in the
ine and 10 men in the mill. This mine is the largest producer in the
strict tributary to Amador City.

The Bunker Hill mine gives employment to about 70 men, more than at any time in its past history, and is paying better than ever before. The 40-stamp mill is running steadily. About a ton and a half of sulphurets are turned out daily, which are sent to the Stewart reduction works for treatment.

The El Dorado quartz claim is located east of the Keystone, and is owned by Dr. T. H. Mayon and others. A shaft has been sunk to the depth of 270 feet. Recently a tunnel was started from the shaft at a depth of 100 feet from the surface, and running in a northerly direction. Two shifts of 10 hours each were employed on this drift, and after reaching 30 feet from the shaft a fine body of quartz was struck. The ledge shows 6 feet in width, the ore being of a similar character to that in the Keystone and adjacent mines. It shows considerable sulphurets, and prospects well. The indications favor the development of another paying mine.

The Zeile mine continues to be a steady producer, and employs 120 men. The ore is low grade, but by economic management it has been worked successfully. The ore-body is of vast extent, and 120 tons are passed through the mill every twenty-four hours.

The Median mine is again in operation, and bids fair to become a paying property. A New York company secured an interest in the property and are bearing the expense of the present work, it being the intention to open up the mine in a thoroughly systematic manner. The shaft will be put down to a considerable depth, and levels opened every 100 feet. Ten or twelve men constitute the present working force, but it will be largely increased when the point for drifting is reached, as it is intended to sink and drift at the same time.

Plymouth district.—The annual report of the Plymouth Consolidated Gold Mining Company makes the following exhibit:

Gold bullion produced by the mines of this company for 1884	$1,033,518 29
Operating expenses	331,163 84
Profit	702,354 45
Twelve monthly dividends, of $50,000 each, were paid, amounting to	600,000 00
Surplus over operating expenses and dividends	102,354 45
Add surplus on hand January 1, 1884	44,559 96
Total surplus	146,914 41

The following account shows that a little less than one-half of the surplus was expended on permanent improvements, principally in changing the motive power from steam to water. This outlay has added largely to the value of the property, and will effect a considerable reduction in operating expenses:

Surplus	$146,914 41
Tyler ditch	65 00
Simpson ditch	626 42
Purchase of real estate	210 00
Construction of Simpson ditch reservoir	1,343 14
New tunnel on lode line and development of Pacific claim	4,853 49
Purchase of real estate from Woolford	6,007 84
Construction of shaft on Woolford property	2,654 87
New works, shops, &c., and general improvement	10,560 56
Purchase of property, pipe, &c., and altering machinery; all in connection with change of power from steam to water	46,298 03
Total	72,619 35
Cash on hand	74,295 06
	146,914 41

The operations of the year are described as follows:

During the year both mills have been run with regularity, crushing in the aggregate about 80,000 tons of ore. The average yield of gold was $13 to the ton. Deducting from the operating expenses the value of material on hand and unusual outlay in reconstructing Empire mill, &c., the cost of production is shown to be as follows:

	Per ton.
Cost of mining	$3 20
Cost of milling	48
	$3 68
Add cost of saving and reducing sulphurets	21
Total average cost	3 89

Water power has been substituted for steam and will hereafter run all the machinery on the property, including the two mills, and the hoisting apparatus. The water is supplied from the canals of the company except that used in the Pacific mill, which is furnished with power under an old contract with the Amador Canal Company. Steam connections have been retained at the shafts, so that in the event of accident, a change could be made from water to steam at an hour's notice. The introduction of water-power will effect a very large saving in operating expenses.

The prospect tunnel being run south from the Pacific shaft on No. 2 level, has made large progress. On the 31st of December, 1884, it had been run to a point 527 feet from the shaft. Small bodies of ore have been found, but nothing of consequence. The superintendent expects to encounter the large chimney of ore believed to exist on the Indiana claim before the close of the year 1885.

Sinking was begun again at the Pacific shaft December 31, 1884, with a view to opening another level. The superintendent writes that the next lower level will be better in quality, and probably larger than any preceding.

Machinery is also being put in place for the sinking of a shaft on the Woolford mine at a point about 600 feet east of the north shaft of the Empire. The shaft will be sunk on the vein, and there is good reason to believe that a valuable deposit of ore will be uncovered. The Woolford mine has been taken charge of by Messrs. Hayward and Hobart, and a force of men put to work. The hoisting machinery has arrived on the ground, and it is probable that 50 men will be employed in a short time.

The War Eagle claim, one mile west of Plymouth, is being opened and equipped.

The Tom Moore claim, 2 miles north of Plymouth, is showing rich ore. This mine, if properly equipped, will prove a valuable property as its ore has a milling value of $50 per ton.

Sutter Creek.—The Mahoney mine has resumed operations under new management. The shaft has been sunk 100 feet deeper, bringing it to a total depth of 1,000 feet. The mill is partially engaged in doing custom work for neighboring mines.

The Iowa mine has a seam 2 inches wide of rich ore, milling over $100 per ton.

The Lincoln mine is running 20 stamps of its mill; the ore is of low grade, but yields more than sufficient to pay expenses.

The Eureka is sinking a shaft to the depth of 200 feet on the side of the ledge. The rock is hard and the work necessarily slow. If the mine develops, a 40-stamp mill will be erected.

The Consolidated Amador is now in ore of a better grade, and it is hoped will become again productive during the coming season.

A new discovery has been made and located on Sutter Hill, near the Summit mine, in which small seams of apparently rich quartz appear.

Drytown.—The Potosi quartz mine, located between Drytown and Plymouth, was taken in hand about nine months ago by a company of nine workingmen, who obtained consent of the owners to work it on their own account and make what they could out of it, with the understanding that if they should make rich discoveries the owners should have the right to immediately resume possession by paying the miners regular wages for the time they had spent on it. After prospecting for seven months in running a tunnel into the side hill in a northerly direction, a ledge from 12 to 15 feet was encountered. The 10-stamp mill was at once started on about 6 feet of the ledge lying next to the foot-wall. It is believed the entire ledge will pay, but the mill is too small to crush the whole of it. They have cleaned up three times, the yield averaging about $3.50 per ton.

At the Gover mine the water has been reduced to the 600-foot level. It is the intention of the present management to explore in the 400-foot level for the ore-body. At this point some rich ore was extracted, and it is confidently believed that a little drifting will result in the discovery of further pay ore. The mill was to have been started at once, but it is found that water for that purpose cannot be had until winter.

The Seaton mine progresses slowly. The new pump, put in to control the water, had to be taken out. It worked very unsatisfactorily, and was continually breaking. The water is now controlled by bailing. It is contemplated starting up the Mammoth 10-stamp mill shortly to put through the rock already out, which will take about two months. After that it is probable that the mill will be torn down and removed to the Light-house mine.

The sulphuret works at this place were started up recently with every prospect of a long run. They are now working on sulphurets from Grizzly Flat, Eldorado County.

There are five chlorination works in active operation in this county at the present time. The Talisman mill was recently started on South Spring Hill ore with the prospect of being kept steadily at work. The draining of the Mahoney shaft continues to progress satisfactorily. The water is now up to the 800 foot level.

The prospects of the Loyal Lead are more encouraging than at any time since its owners commenced operations. The last run paid $3,000, and the present run, judging from indications, promises to exceed this by at least $1,000. The ore is taken out from the tunnel 70 feet from the surface, and no ore has been taken out below this level. For a long time the ledge was followed in a southerly direction, running toward the Gover, but latterly it has been taking an eastern turn.

The clean-up at the Telegraph Hill, situated in upper *Rancharia district*, recently made, realized about $3,000 for about four months' run. The water supply has given out for the season, but drifting operations will be carried on to a limited extent until water can be had. There are no gravel claims at work at present in this district.

Ione.—The claim of the Arroyo Seco Mining Company, better known as the Lambing gravel claim, in Ione Valley, is now in order to begin operations with the steam derrick lately put up. The main body of the car is 40 feet in length, set on six wheels and mounted on railroad iron. It is operated back and forth by machinery with double engines and a pair of boilers. The mast is 50 feet high, and the boom 118 feet long.

The buckets hold 27 cubic feet of earth, and it is calculated to dump a bucket every 1½ minutes. This costly piece of machinery has been put up for the purpose of raising the pay dirt, so as to be able to work it to advantage. The deposit in this mine is in a former creek bed, with 20 feet of soil to be stripped off before the pay dirt is reached. One of the main difficulties has been to control the great flow of water. This has been mastered by putting in two powerful pumps in the pit, already sunk to the bed-rock to the depth of 35 feet. This, it is believed, will enable the 100-acre basin to be worked without obstacles as far as water is concerned. But the most formidable difficulty has been, and is still, to get rid of the enormous quantity of non-gold-bearing top dirt. At first horse-power scrapers were used, but these were speedily discarded as too slow and costly. After careful study, Mr. Lambing concluded that a derrick operated by steam power is the most feasible plan of overcoming the difficulty.

A Stockton company has taken a contract to sink 100 feet on the La Plata mine, between Ione and Forest Home. Everything is being made ready before the rain sets in. Several tons of the surface ore were prospected in their 2-stamp mill this fall, which is said to have yielded well for this kind of ore.

The Gartlin mine, owned by Thomas P. Gartlin, is a steady producer.

Volcano.—The Volcano Gold Gravel Mining Company has a large number of men at work repairing the flumes and putting new blocks in the boxes.

Mr. Gillick is crushing ore from his claim which averages $35 per ton.

The Grass Valley mine has been in successful operation during the season, as has also the Acme mine and mill.

The Tunnel Company has completed its flume and is now producing.

The Downs mine is taking out good pay ore, and its mill is running to its utmost capacity. The ledge is 5 feet wide, and mills $10 per ton.

The Terikoff mine is driving a tunnel to tap its ledge.

The St. Louis, which is located near Irishtown, is being worked by Messrs. Reed & Smith. They take out on an average about three-quarters of a ton of ore per day. The ore is crushed by an arrastra, and yields from $10 to $12 per ton.

Messrs. Hadley & Cassinelli, of this place, have commenced operations on the old Siebenthaler quartz mine, situated 5 miles north of Volcano. They have purchased the Golden Gate hoisting works, and have moved the machinery to the mine. Six to eight men are employed, and it is reported that good ore has been struck in sinking.

Oleta.—The gravel claim of the McKee Brothers, at American Flat, was cleaned up a short time ago. The season's run was about three months, and the amount taken out was $1,200—considered a satisfactory result.

BUTTE COUNTY.

The following excellent review of the mining industry of Butte County was prepared by R. L. Dunn, of Auburn:

The importance of the mining industry in this county has been gradually diminishing for several years past, though a few large paying mines keep up the figures of the gold yield and one important and extensive enterprise, the Big Bend Tunnel, is being energetically pushed. This is due to the exhaustion of the surface placers, which for years have supported a large Chinese mining population, the closing down by the action of the courts of the large hydraulic mines in the vicinity of Oroville, and the absence of quartz ledges which would yield steadily a pay-

ing grade of ore. A résumé of operations in 1884 shows no new discov eries of importance, nor any reason for anticipating developments in th near future.

The inclusive superficial area of the auriferous district of this count is very large, but the localities in which profitable mining is being don cover only a small portion of this region. Many of the districts onc important mining centers are now either entirely abandoned or give over to a few Chinese or stranded Argonauts, who gain a scanty subsist ence working over old tailings or crevicing in the ravines and gulche

Wyandotte.—In this district no systematic mining is being done no likely to be. A little gold is taken out by individual miners workin in the ravines during the rainy season.

Oroville.—Comparatively little mining is now being done in this dis trict, which a few years back was the scene of the most active an profitable gravel mining in this county.

The Miocene, a large and splendidly equipped hydraulic mine, wa shut down by injunction after a few days' run in the summer of 188

It will probably never be worked again to any great extent. Durin 1884 a little drifting was done, but was not very profitable, as the gol is not sufficiently concentrated into pay streaks to admit of any profit able method of working other than the hydraulic. Some of the shallo ground on Thompson Flat was rented out to the Chinese, who sluice it off with fair returns.

The Powers claim, on the river opposite Oroville, and adjoining th Miocene on the south, has been practically abandoned through fear c injunction. The Hewitt Claim is similarly affected, and no work i being done on it.

The placers at the lava beds about 2 miles south of Oroville, on th east bank of the Feather River, are rapidly becoming worked ou During the year about 200 Chinese have been employed in drifting, an the output of gold is about $50,000.

An enterprise is projected which, if carried out, will render possibl the development of some mining ground, which there is every reason t believe is enormously rich, but under existing conditions can never b worked successfully. It is the construction of an irrigation ditch of capacity sufficient to carry the entire flow of Feather River at low-wate stage from a point about 2 miles above Oroville. The water to be han dled during the five summer months is from 40,000 to 50,000 miner' inches, which will be distributed over a large area of land in Butte an Yuba Counties, now comparatively unproductive. Taking the wate into the canal will make it possible to work several miles of the channe of the river, which is believed to be very rich. Also, it will be possibl to drift in and bottom the deep gravels at Oroville, which the poro nature of the ground and the nearness to the river has heretofore mad impracticable. These deep gravels are part of the channel of the Plic cene or Miocene River, which made the auriferous gravel deposits a this point.

Morris Ravine.—In this district, which contains some valuable hy draulic properties, no work is being done for fear of injunction. Th gravels are not rich enough to make drifting profitable.

The Treasure Box drift mine, under Table Mountain, is not bein worked, thorough prospecting having failed to develop any pay grav if worked by drifting, though all of the gravel could be very profitabl worked by hydraulicing.

Nothing has been done in the Banner or in the McSmith quartz mine

Forbestown.—Very little mining has been done in this district durin

the year. The placers are practically exhausted and abandoned. None of the numerous quartz veins have developed into mines. A few rich pockets were discovered during the first excitement, but in none of the ledges has a chute of mill-rock been found.

Some six miles west of Forbestown, on the South Fork of the Feather River, near Enterprise, is the Oro quartz mine, one of the most promising in the county, on which a shaft is down 250 feet on a ledge 6 feet wide, and the ore taken out has milled $16 to $50 per ton. The water coming in, work had to be abandoned in the shaft and a tunnel has been run from the level of the river which will give 1,500 feet of upraise in the ledge at the shaft. A thousand feet of tunnel remain to be run.

Cherokee Flat.—The Spring Valley hydraulic mine, the largest in the county, and the only large hydraulic mine in the State that has been worked during the year, is situated here. The hydraulic banks are getting very high, and a larger proportion of waste has to be washed with the pay gravel than in former years. The mine is a large bullion producer, though the percentage of profit is not as large as formerly.

To avoid litigation and injunction, the company has bought up all the land injured by the tailings. No new developments are reported during the year.

The other mines in this district are small and unimportant. Very little work has been done on them during the year, and no new developments made.

Big Bend.—This is the scene of the most important mining enterprise in Butte County, and one unique in the history of mining. It is what is known as the Big Bend tunnel, which, when completed, will be over 12,000 feet long, and will carry the entire flow of the main Feather River, leaving 13 miles of river bed exposed for working. The work is being energetically pushed, and the completion of the tunnel assured by July, 1886. Though a great outlay of capital has been made, the expenditures have thus far been within the estimates, something unusual in the history of large engineering enterprises. In the item of roads alone about $30,000 have been expended. A town of 300 inhabitants and a saw-mill have been built. In the tunnel 75 men are employed in three eight-hour shifts. Machine drills operated by compressed air are employed and give excellent satisfaction. The president of the company writes, under date of February 25, 1885: "Our tunnel was, on February 7, in for a distance of 7,342 feet, leaving only 4,665 feet to be completed. At our present rate of progress the tunnel will be easily finished by May or June of 1886. The tunnel is 9 feet high by 16 feet wide, and is deemed by competent engineers of sufficient size to carry the entire water of the river during the season."

Magalia.—This is still the leading drift-mining district of Butte County, and has been very profitably pursued during the year.

The Magalia or Pershbacker continues its heavy yield. The tunnel is in about 3,400 feet, the channel continuing narrow, but very rich, single car-loads of the gravel often containing several hundred dollars' worth of dust. Nuggets are often found in the gravel several feet from the bed-rock. From thirty to thirty-six men are employed in this mine. It is said to have yielded over $250,000 in the four years it has been paying, and certainly is one of the most successful drift mines in the State.

The Indian Spring drift mine employed about 100 men during the year, and has been the most important in this district. The deposit of gravel in this mine, though not so rich, is more extensive than in the Magalia.

On *Butte Creek* are a number of small, unimportant mines. None o them have employed over four or five men, and no new development of any importance have been made. Most of the mines are what ma be termed wages claims and are not permanently worked. In the ag gregate perhaps sixty white men and Chinese find intermittent em ployment in about half that number of claims, and produce from $25,00 to $35,000 annually.

The Chinese production for 1884, coming from the Lava Beds, Cli per Mills, Bidwell's Bar, Butte Creek, and river mining on a small scal was about $70,000.

Cherokee Flat.—The Spring Valley hydraulic mine, the largest in th

COLUSA COUNTY.

This county has but few mines, its industry being almost entirely a ricultural. The principal mining property is at Sulphur Creek, and owned and worked by William Cherry.

CALAVERAS COUNTY.

Mr. C. B. Higby, of Mokelumne Hill, says of this county: No count in the State of California is more distinguished for the variety and e tent of its mineral resources than Calaveras. From the earliest di covery of gold on the Pacific coast, through all the transitions in th mineral section and the changes in the methods of mining, it has co tinued to hold a front rank among gold-producing localities. In th value of its production it is exceeded by three or four of the other cou ties of the State, but in the variety and extent of its undevelope resources and its natural facilities for successful mining operations stands pre-eminent. It contains a greater area of purely mineral te ritory, a larger number of gold-bearing quartz veins, and more exte sive deposits of auriferous gravel than other county in the State. I numerous mountain streams, supplemented by a vast net-work ditches, added to a favorable climate, enable mineral operations to t successfully prosecuted at a minimum cost. The opportunities for th prospector are still abundant; the mineral belt, traversed in every d rection by quartz ledges and channels of gold-bearing gravel, is 3 miles in length by 20 in breadth.

The mining interests of this county are as varied as they are extensiv In addition to the quartz lodes, there are gravel deposits only exceede by those of Nevada County. While not conducted on as large a sca as in some other localities, the area number of claims in actual oper tion are larger. In addition to gold-mining, chrome iron exists in abu dance, and deposits of manganese are by no means rare. The form has been extensively and successfully worked, but no organized effo has as yet been made to render the latter productive. Deposits asbestos are numerous, but the working has never reached beyond th dignity of prospecting. Brown hematite iron ore of the finest quali is exceedingly abundant; but, owing to the cost of transportation, th resource has remained undeveloped. There are immense quarries marble, beds of soapstone, and other mineral resources existing in gre abundance.

Calaveras is centrally located in connection with the mineral sectio Topographically the face of the country is a succession of rolling ridg following the same direction as the water-course. Diversified with n merous peaks and occasional low hills, the country is well watered

the Mokelumne, Calaveras, San Antonio, and Stanislaus Rivers and their numerous branches.

Angels district.—The Angels is the oldest, most extensive, and by far the most important quartz-mining district in the county. The great northern lode of the State extends through the entire district in a northerly and southerly direction, locations upon which were made at a date coeval with the inception of quartz mining. Within the past year or two a great revival in mining has taken place, the district at this time presenting a scene of unexampled activity. Old mines are being reopened, mills erected, and work pushed forward in every direction. Capital and labor joined hands in the work of development, and their united efforts have led to a measure of success equaled in but few localities. Several new mills have been put in operation the past year, and more are being built.

Near Altaville are located the Cherokee, Gillman, and McElroy mines. The Cherokee, the property of B. R. Prince, is now being pumped out preparatory to beginning active operations. This was, in early days, an enormously rich mine.

The Gillman has been bonded by a San Francisco company, machinery erected, and the shaft is being sunk deeper. This mine is what is usually termed a "pocket" lead. The McElroy has been worked for twenty years, but has never paid.

There are several gravel mines at Dogtown, situated about four miles northeast of Altaville, the most noted of which are the Deep Blue Jupiter, hydraulic, the Bully Bully, and the Jack Rabbit. The first is owned by Keefer & Co., and is supposed to be rich. More than $60,000 have been expended in opening this mine. The Jack Rabbit never produced any gold worthy of note. The Bully Bully has not been worked much for the last few years; still a great deal of money has been taken out of it from time to time.

Smith's Flat, situated about one mile west of Angels, is noted principally for the Gold Hill mine, owned by George Osborne & Son. It is at present one of the richest quartz mines in Calaveras County. It was discovered in 1855, and more than $50,000 was extracted from it during the first two years. Some ten or twelve years ago it was purchased by the present owners, who have worked it since, realizing therefrom about $45,000. The lead from which these large deposits have been taken is not more than six inches in width. Near this vein is another lead, 12 feet wide, which yields, on an average, $50 per ton. There are several other quartz mines in this vicinity which are not worked.

There are several quartz mines at Albany Flat, 3 miles south of Angels. Among the most important is the Reed pocket, which was discovered about eight years ago, and has been worked steadily since that time. When first discovered $25,000 were taken out in a short time. There are several other mines of less note which are lying idle. The famous Stevenot mine is located between Carson's and Albany Flat, from which an immense deposit was taken out in 1854.

Carson Hill, situated about 4 miles southwest of the town of Angels, is a celebrated mining locality. Here is located the Morgan, the richest mine in the county.

Next is the Reserve, purchased some time ago by a San Francisco company, who erected a 30-stamp mill, and have worked it for months with good results. The other mines are not worthy of especial mention.

Commencing at the northern end of the great mother lode in Angels district proper, the first mine located is the Marshall, discovered by the Winter Brothers in 1852, and worked by them for twenty years. They

realized about $200,000 out of it in that time. It was then purchased by William Bovee, who worked it successfully for several years. It has since passed into the hands of Captain Cushing and others, who erected a 10-stamp mill and are now working it with fair results. The main lead is 12 feet in width.

Adjoining the Marshall on the south is the Dock Hill, owned by Henry B. Potter. At a depth of 150 feet the vein is 13 feet wide, about three of which will yield from $100 to $150 per ton. The remainder will pay from $10 to $12 per ton.

Next on the line is the Big Hill mine, also partly owned by H. B. Potter, who is working the ore with an arrastra. The main lead, at a depth of 180 feet, is from 15 to 20 feet wide. The average yield is from $15 to $16 per ton.

The Invincible adjoins, on which a new 10-stamp mill and hoisting works have been erected, and work is being prosecuted. The lead ranges from 9 to 14 feet in width.

The Stickles is next, the shaft of which has recently been timbered and the construction of a 10-stamp mill nearly completed. There is in this mine an immense body of quartz, which, it is said, will pay well. There are two more mines on this lead that were developed in former years, but are not now being worked.

The Gold Cliff has been steadily worked for several years with good results; 30 stamps are employed in crushing the ore, which is of a talcose nature.

The Matson has a 5-stamp lately erected. The ore is low grade.

There are in the Angels district quite a number of arrastra mills, working ore taken from the numerous veins in that vicinity, generally pocket ledges. Among the more important is the North End.

But little or nothing is being done in the mines at Robinson's Ferry.

Murphy's district.—This is among the oldest districts in the county, and contains a goodly number of paying mines. Among the more important are the properties comprised in the group owned by the Oro Plata Mining Company. There are seven mines in the possession of the company—Red Wing, White Wing, Oro Plata, Oro Plata Extension, Pay Rock, Fernian, and Silver State—six of which are in limestone formation. The seventh, the Fernian, is in slate, and lies in close proximity to the Oro Minto. The company employs 17 men; 400 feet of levels, tunnels, &c., were run the past year, and 3,500 tons of ore extracted, of which 2,500 were reduced, averaging $2.50 per ton. The stamp-mill is run by water-power, and has a capacity of 35 tons per day. Only the free-milling, low-grade ore of the Red Wing has been worked during the past year. A 5-stamp mill has been used to experiment on the low-grade ore, of which there seems to be an immense supply, with such success as to induce the company to add more stamps. The new mill has been running six weeks, and the company is reducing ore at a small profit per ton. The company's pulverizing mill of 30 tons' capacity, designed to work the high-grade ore, which is very rebellious, and the chlorination works, have been idle the past year. The Fernian mine was purchased by the Oro Plata Company some few years ago. There is a shaft on the mine 160 feet deep; the ore is high grade, about the character of that of the Enchantress. Several hundred tons of rock worked in the Calaveras mill, and some in the Wood's mill, averaged $40 per ton. It has not been worked for several years. The ore in this district is rebellious and high grade.

The "Lost Kid," situated on Red Hill, was discovered during the

year. There is a shaft 50 feet deep on the mine, from which 100 tons of quartz have been extracted. About 40 tons were milled, which yielded $40 per ton free gold. The rock is sulphuret in character. The company has a 1-stamp water-power mill of 4 tons' capacity per twenty-four hours, and 2 men employed.

One-fourth mile east of the Lost Kid is the Eddie Dewalt. During the past year but little more than assessment-work has been done on it. The vein, at a depth of 60 feet, is 2 feet wide. Bunches of quartz are sometimes found of exceeding richness. The ore is refractory, and will average $20 per ton.

The Roble mine, located a mile south of Murphy's, on the ridge between San Domingo and Angel's Creek, is owned by San Francisco parties, and has not been worked owing to litigation. It has a 5-stamp mill, run by water-power, situated a mile from it.

But little progress has been made on the O. K., situated near the Roble; it is being worked by 2 men. Other mines in the same vicinity, upon which little more than assessment-work has been done during the year, are the Buckhorn, Bavarian, and Lone Pine.

The Fairplay, located 1 mile northwest of Murphy's, has not been worked the past year. There is a 5-stamp mill, pulverizer, concentrator, &c., on the mine. The Comet is worked by tunnel and shaft; 140 feet of tunnel and 40 feet of shaft; width of vein, 3½ feet. Two hundred tons of ore are on the dump, which will work $8 per ton.

The Collier mine is not worked at present. It has a 5-stamp mill run by water-power.

Two men are employed at the Homestake, which has a shaft 115 feet deep and levels 150 feet. The ore runs $12 per ton.

The Sunny Side lies in close proximity; but little more than assessment-work has been done during the year.

The ore of these mines is sulphuret in character and high grade.

The Washington, situated on San Antonio Creek, shut down some months ago. The shaft, on which is located hoisting works, reaches a depth of 115 feet, from the bottom of which a drift was run 100 feet to cut the vein. The lode at this point not proving as good as expected, the works were closed down.

A discovery of some importance was made a short time since on Indian Creek of a quartz lode called the Maria. It is situated about 3 miles northwest of Murphy's. The vein will average 2 feet in width, the quartz is free milling and high grade. There are 70 tons of ore on the dump that will net $40 per ton.

Sperry's iron mine lies 1 mile north of Murphy's, in a direct line with the narrow gauge to the Big Trees. The deposit is three-quarters of a mile in length, and 12 feet wide; 175 feet of tunnel were run on the mine the past year. The character of the ore is brown and red hematite, 60 per cent. iron.

Copper has been found a few miles west of Murphy's, but not in paying quantities. Tin ore has also been found within a mile of town, and a tunnel was driven several hundred feet in length in the hill northeast of Murphy's some twenty years ago to strike the vein, but abandoned.

Washington district.—This district contains but few mines, which are noted, however, for the richness of their ore.

The Calaveras Gold Mining Company has two mines, the Oro Minto and Enchantress, both being worked. They are situated on Indian Creek, about 5 miles north of Murphy's.

The Oro Minto has two shafts, one 325 feet deep, the other 400. Near the latter there is a 100-horse power engine which drives the

machinery of the hoisting works, and a Reynolds and Rix No. 1 compressor which drives the drill. During the past year 600 feet of levels, drifts, and winzes have been run. On the 400-foot level, running easterly, a large body of ore has been uncovered, several thousand tons of which are in sight and easy of extraction when milling facilities are provided. The lode is from 3 to 7 feet wide, high grade, carrying a large percentage of sulphurets and base metals, galena, antimony, &c. No ore has been worked from this mine since the mill burned down several years ago. There are 2,500 tons of tailings near the company's mill, which, from careful assay, average $9.50 per ton. Four hundred tons of ore of fair quality are now lying on the dump, and 8 men are employed.

The Enchantress lode starts about 100 yards east of the Oro Minto shaft. The mine, though opened years ago and rich ore extracted, has not been worked until within the present year. There is a shaft on the mine 100 feet deep. A 35-foot level runs northeast, and one of 138 feet southwest. The ore is much the same character as that from the Oro Minto, but more rebellious. At the present depth the vein is two feet wide. Hoisting-works have just been completed over the shaft and a donkey-engine placed in position to drive the works. It is the intention of the superintendent to run levels and stope out ore. There were some 20 tons of this ore worked in Wood's mill, on the San Antonie, recently, but its rebellious nature gave but little indication of what gold it contained. About $20 per ton of free gold was saved from it.

The Washington mine is situated about one-fourth of a mile northwest from the Oro Minto hoisting works. The quartz has the same bluish tint that characterizes all the ore in this district and contains a higher percentage of galena than that of the Oro Minto; otherwise it is similar and about the same grade. There is a tunnel of 400 feet in length on the lode, running northeast. Two hundred tons of ore were extracted and worked the past year which averaged $20 per ton. The company have an 8-stamp mill on San Antonie Creek, run by water-power. The mill does not run regularly, however, as there are at present only 2 men at work in the mine, who stope out 3 tons of ore per day which 2 others haul to the mill.

The Right Bower is the oldest mine in the district, situated one mile northwest of the Washington; it has not been worked for a number of years. Formerly it was extensively worked, and gained considerable notoriety as a producer.

The Fricot and Chavanne mine, formerly the Carruthers, is situated about one mile southwest of the Washington. The greatest depth which has been attained is 200 feet. A level has been run 280 feet, showing a lode at bottom of shaft, 3 feet wide. The character of ore is sulphuret, much the same as that taken from the Enchantress, 30 tons of which are on the dump, which will mill $40 per ton; 7 men were employed at the mine when it closed down some few months ago.

Westward on Indian Creek the Greim mine has a vein from 6 inches to 2 feet wide, from which 5 tons of ore yielded $50 per ton; 9 ounces of gold were mortared out by hand during the week ending November 22, this year. The shaft was sunk 70 feet during the year, 2 men being employed.

Upon the Cunliff and Driver mine a 60-foot shaft has been sunk and 60 feet of tunnel run during the year. Upwards of 250 tons of quartz have been worked the past year, averaging $30 per ton. The company have a 2-stamp battery and two arrastras running, and employ 3 men.

Only assessment-work has been done the past year on the Moss and Rider. There are several tons of quartz, of fair quality, on the dump. The Bon Ton is situated in close proximity to the Moss and Rider, and is of the same general character.

Sheep Ranch district.—There are but few mines in this district, the principal one being the Sheep Ranch. This mine has paid continuously since its discovery in 1865. It enriched its locators, who worked it in a small way, finally selling the property to Messrs. Haggin and Tevis, of San Francisco, for a large sum. The latter gentleman immediately commenced operations upon a more extensive scale. The crushing capacity was increased to 30 stamps, powerful hoisting works erected, Burleigh drills put in, and in fact the mine supplied with all the modern improvements both in mining and milling machinery. The force of hands employed was also largely increased, a considerable village being the outgrowth of the operations connected with the mine directly and indirectly. The present depth reached is 700 feet. Levels have been run at intervals of 100 feet from the top, averaging 650 feet in length. The vein is what is technically called "kidney shaped," varying from 5 inches to 5 feet in thickness. The ore also varies in richness, but the average is about $20 per ton. As near as can be ascertained the mine produces $18,000 per month. There has been no diminution in its yield for years. The once equally famous Chavanne mine is now consolidated with the Sheep Ranch.

The Harrington and Andrews mine, now owned by San Francisco capitalists, is a productive property; it is located near Cave City. About 1,000 feet of tunneling have been done and several shafts sunk. The mine is supplied with an excellent 20-stamp mill, which has crushed a large amount of ore. No report of the yield could be obtained. New hoisting-works are now being worked.

Other quartz mines are the Wheelock, Amelia, and Calaveras.

There are several small hydraulics in the district, the principal ones being operated by the Table Mountain and San Andreas Water Company, and Cunes & Co. These mines are fairly productive.

The Riley claim is worked through a tunnel, and pays well.

Mokelumne Hill district.—There is considerable depression in this district at present so far as quartz mining is concerned. The gravel mining interest, however, is being vigorously prosecuted with great success. This is the great gravel washing district of the county, fully three-fourths of all that species of mining done in Calaveras being located within a radius of 5 miles from Mokelumne Hill. Generally speaking the gravel mines are at present as productive as at any period within the past ten years, and the auriferous deposits are so vast that they will not be exhausted for decades to come. The *anti-débris* agitation has not yet affected the gravel mining interests of Calaveras, and as the tailings are dumped only into unnavigable streams, it is probable that work will continue uninterruptedly for an indefinite period. Several mines that have heretofore been worked by the hydraulic process have recently changed their system of operating to that of drifting, erecting stamp batteries for crushing and pulverizing the gravel. The district is supplied with water at reasonable rates, from the ditch of the Mokelumne Hill and Campo Seco Canal and mining company.

Quartz mines.—Only one new enterprise of magnitude in quartz mining has been inaugurated during the year—the working of the Finch Gold Mining Company's claim. The mine is located about 3 miles southwest of Mokelumne Hill, near the river of that name, and is under the superintendency of Mr. William Sales. The workings on the mine

are comprised in a shaft 120 feet deep, and two cross-cuts. A led eraging 15 feet in width, with a stratum of exceedingly rich ore hanging wall, has been developed. The prospects for a good mi excellent, and if the present favorable indications continue mac will soon be put upon the property.

The well known Boston or Experience mine is located in Bu Gulch. The workings consist of tunnels, drifts, cross-cuts, &c., de ing a gigantic body of ore, both sulphuret and free-milling. The fine 20-stamp mill on the mine and all the appurtenances necess working to advantage, and yet on account of litigation this va property is lying in idleness.

The once famous Gwin, a mine whose gold product cannot hav less than $3,000,000 is in this district. The Gwin has been worke depth of 1,500 feet, excellent ore being found in the bottom of the and lower levels. Work was suspended on account of the inade of the machinery to handle the ore and water. There is no prob of the resumption of operations in the near future.

The Lamphear mine, located in Spring Gulch, has a 12-stamp power mill. Shafts and levels have been run, the ore extracted ing from $6 to $20 per ton. The mine is now idle.

At Rich Gulch are the Tiger, Foot and Thompson, and Anglo mines. The first mentioned has a 10-stamp mill. These mine been prospected with good results, but are now idle.

Active operations continue at the Hoosier Consolidated, near key Slide. Three tunnels have been run on the vein at varying d and a shaft sunk to the depth of 80 feet, developing a splendid b ore. There is a good 10-stamp water-power mill on the prope which the quartz is conveyed down an inclined tramway, so arr that the cars are operated automatically. The vein is from 2 to thick, and yields from $4 to $10 per ton.

The Mount Smolus, in the same vicinity, has been worked to a of 350 feet. It has a 10-stamp mill and steam hoisting works, now idle.

Other quartz mines upon which work has been done are the lumne Hill, Bryan, White Swan, and Quaker City.

Gravel mines.—Among the most important of the gravel mines Eureka, owned by the Cook Brothers. There are two ditches con with this mine, supplying 1,000 inches of water. The mine, work hydraulic principles, yields about $60,000 per year.

On Tunnel Ridge are the Bonanza, Mammoth, and Penobsc draulics. About 400 inches of water are used in each, under a pr of 100 feet. All are fairly productive. A mill is now being erec the Mammoth, with the intention of changing the method of w from hydraulicking to drifting.

Among the more notable tunnel claims in the same ridge are tl Cann, Green Mountain, Rough Diamond, and Contention. The Mountain and Rough Diamond have batteries for crushing their g the former being one of the most remunerative claims in the cou

In Old Woman's Gulch there are the Empire, Safe Deposit, Ball, and Hartman claims, all worked through tunnels except the Ball. The Empire comprises 80 acres, and is patented.

In the famous Chili Gulch are the Star & Matteson, Duryea, Cheer, Hughes, Bob Paul, Calaveras, and Sullivan claims. The D for years worked as a hydraulic, is now being drifted, a 5-stamp b crushing the gravel. It is, and has been for years, one of the bes ing properties in the county. The Star & Matteson is worked th

an incline. Thousands of feet of drifts, levels, breasts, &c., have been run, the gravel being crushed in an 8-stamp battery. The mill and hoisting works are run by water-power; a new incline is now being run. Work has lately been resumed on the What Cheer, an incline in Stockton ridge. Hoisting works have been erected for the purpose of freeing the mine of water and taking out gravel, operations being vigorously pushed, with good prospects.

The Kramer mine is located in Poorman's Gulch. A tunnel 1,500 feet in length was run through solid bed-rock before gravel was reached, costing years of toil and thousands of dollars. Pay dirt is now being extracted.

The work of re-opening the old Coffee Mill claim, near the Golden Gate ranch, has lately been undertaken, and operations will be urged industriously.

Other gravel mines not at present in operation are the Boucher and Brackett, Excelsior, Concentrator, Pine Peak, South Star, and Happy Valley Blue Gravel.

West Point district.—Mining operations in this old and famous district are not as lively as could be wished. Still considerable prospecting is being done, and several mines are paying well. Much of the dullness in mining circles is attributed to the fact that the mineral land is being largely taken for agricultural purposes.

The most important new enterprise that has been commenced during the year is the erection of furnaces for the working of sulphurous ores by what is known as the Russell process. But little information could be obtained about either the process or its results, although great hopes are built upon it.

The quartz veins in the West Point district are, as a rule, narrow, carrying high-grade ore. At water-level depth the quartz almost invariably becomes sulphurous—some other process beyond milling being necessary to separate and save the gold. It is hoped that the Russell process will supply what is requisite for that purpose. It is estimated that about 1,000 tons of ore have been crushed in the district the past year, yielding an average of about $30 per ton. There is a 3 stamp and five arrastra mills in the district.

Among the mines worthy of mention are the following: The Bismarck, from which the owners have taken out and crushed 150 tons of rock, which paid $40 per ton. It has a shaft 50 feet deep and a vein 2½ feet wide; at present a working shaft for further operation is being timbered. The Scorpion has crushed 60 tons of rock, which paid $30 per ton; at present it is idle, owing to litigation; there are three shafts on this mine. The center, or engine-shaft is down 110 feet, with a vein on bottom 2½ feet. The south shaft is down 95 feet, with a 2-foot vein. The north shaft is down 50 feet, with a 4-foot vein. The ore runs in the engine shaft $30 per ton, in the south shaft, $110, and in the north shaft $12 per ton.

The Henry mine has crushed 300 tons, which averaged $20 per ton, and has a depth of shaft 120 feet; width of vein 3 feet.

The Star of the West has crushed 150 tons of rock, which averaged $15 per ton. The depth of shaft is 175 feet and the width of vein from 1 to 3 feet.

The Wide West crushed 50 tons of rock, which averaged $30 per ton; it has a shaft 85 feet and a vein from 1 to 4 feet.

The Blazing Star crushed 25 tons, which paid $40 per ton. The shaft is 65 feet, with a vein on bottom 2 feet, the rock prospecting $60 per ton.

The French lode crushed 21 tons, that yielded $28 per ton. The shaft is 50 feet deep, with exceedingly rich rock in the bottom.

The Matrimonial crushed 15 tons, that yielded $56 per ton. Depth of shaft 120 feet. Twenty-five tons of rock from the Lone Star mine yielded an average of $35 per ton. This mine is worked by tunnel and shafts.

The Lockwood and Point mines are now being worked by the Russell Reduction Company. Quite a quantity of ore has been worked, but no information could be obtained relative to its yield. The Point mine has a 7-foot ledge at the depth of 120 feet of low-grade rock.

Other mines upon which work has been done are the Texas, Josephine, Anna, North Star, Maria, Mexican, Champion, Ohio Consolidated, Sacramento, Camille, Riverside, River Bend, Jacobs, Mitchell, Catarrh, Whiskey, Woodhouse, Pride of Bummerville, and Rattlesnake.

Railroad Flat district.—A great many shafts have been sunk, tunnels run, &c., in this district, but with the exception of one mine, all are at present idle. All the ledges carry ore that will mill from $1 to $6 per ton.

The Chicago and Rock Island Mill and Mining Company are not working at present. The ore is low grade. The main shaft is down 260 feet, and a level 400 feet in length has been run. The lead at the bottom of the shaft is 20 inches thick and well defined. The mine has a new 8-stamp mill, and hoisting-works are operated by hydraulic power under 120 feet pressure.

South of the Chicago and Rock Island, and on the same vein, is the Beede claim, 1,500 feet in length, with a number of shafts down from 40 to 80 feet in depth. The vein is prospected for 600 feet and averages 3 feet in thickness. Over 1,000 tons of ore milled averaged $14.25 per ton, the lowest paying $7.50. The mine shows a large quantity of ore.

Two miles south and on the same range is the Chapman, now idle. This mine was a paying one above the water level. It has a shaft 126 feet deep with 200 feet of drift. The vein is from 2 to 4 feet thick; the mill has 5 stamps. Water is distributed over all the ridges at the highest elevation practicable suitable for furnishing hydraulic power to work any mine in the district.

Gravel mines.—The Gravel mines of Railroad Flat are of two kinds—surface and deep. The surface, being easy to work and with little expense, has been rapidly worked out, but the deposits are by no means exhausted. The gravel deposits found on isolated hills carrying gold will not be exhausted for many years. The deep gravel deposits underlying the lava formation is extensive. Prospecting has been prosecuted for years in search of the old river channels, and with the most encouraging prospects. The gold is coarse and of fine quality. All this stretch of mining land is abundantly supplied with water from W. V. Clark's canal, which takes the water from the South Fork of Mokelumne River. This canal conveys the water along the highest practicable elevations, thereby giving the required head for hydraulic pressure for mining and mill power. Several hydraulic claims were in operation during the past year, yielding fair returns. Preparations are being made for more extensive work under the lava beds. W. V. Clark is now putting up two powerful hydraulics, with the intention of drifting out gravel under the lava by hydraulic power. The water that is forced against the strata of gravel will bring out the sand and stones in a flume sunk in the bed-rock. This district comprises about 4 square miles, most of which is mineral land.

Glencoe district.—The principal mines in this district are included in the several properties owned by the Glencoe Consolidated Mining Com-

pany. Work in a small way is being done on the Valentine by pushing ahead the lower tunnel, from which some low-grade quartz is being taken. A tunnel, already 1,050 feet in length, is being run to drain and open the several claims held by this company. Some fair rock is encountered from time to time as the work progresses. The tunnel will enter the Mexican at a depth of about 400 feet, and it is expected to develop a fine paying body of ore. The Woodcock, now called Sierra Queen, and the Dolly Varden, now called Sierra King, are of the same general character as the others mentioned above, and are the property of the same company.

The Alabama, to the west of, and about a mile from, the above locations and nearly parallel to them, has several shafts from 20 to 100 feet in depth. A small force of men has been employed for some time in the development of this ground with varying success. This property also belongs to the Glencoe Consolidated Mining Company, who have on their ground a 20-stamp water-power mill and an 18-stamp steam-power mill, neither of which is at present in operation.

The Occidental—a ledge which cuts across the Sierra Queen—has a small force at work on a 2-foot vein of fair rock.

The Le Franchi, another claim in the immediate vicinity, has a tunnel several hundred feet in length and a shaft 150 feet in depth, with steam-hoisting works. It has a 3 foot lode of fair milling quartz. It is now idle, being involved in litigation.

The Norwich and Fidelity mines are also locked up by litigation.

The Charlotte is a comparatively new mine, lying to the north of the Glencoe Consolidated Mining Company's claims. It is owned by Frittenbach & Co., and promises to prove a very valuable property. There is a 5-stamp water-power mill on the mine. Six men are employed. The mine is worked by a tunnel run upon the lode, which is from 3 to 4 feet in width, between well defined walls, carrying fully 2 feet of good milling ore. The tunnel is now in about 220 feet, the pay ore continuing the entire distance. The work has yet been done below the tunnel floor, where the ore holds good from the mouth to the face of the tunnel.

The Holmes mine, located on the south side of the South Fork of the Mokelumne River, in the same belt, is now idle.

The Blue Jay, a property to the west and north of the Valentine, has several shafts upon it. Some work has been done lately with flattering prospects.

The Centennial is about 1½ miles south of the Blue Jay, and apparently upon the same lode. It has several shafts from 40 to 60 feet in depth and a 100-foot tunnel, and has produced some good ore. This mine is now idle.

The San Pedro, located in about the center of the belt, and but a short distance west and north of the Mexican, has several shafts, and steam-power hoisting-works. It has yielded some very rich ore. But little has been done of late upon the property, although it is generally known that a fine ledge is exposed in its levels. There are numerous small veins of quartz, upon which only work enough to maintain title is being done.

San Andreas district.—Renewed activity is observable in this district in quartz mining, owing principally to developments at the Comet, the most important mine in the district. The Comet is located about two miles from San Andreas, near the Calaveras River, and was formerly known as the Hamby, under which name it was worked upon a small scale with favorable results. The vein matter of the Comet is a species

of talc interspersed with narrow strata of quartz, the whole carrying more or less gold. The vein matter is low-grade, but can be easily and rapidly crushed, and exists in large quantities. The mine is a ridge of the formation spoken of, being almost identical in composition with that of the Gold Cliff at Angels and the Reserve mine at Carson. The workings on the mine are represented by several shafts, tunnels, and cuts, which afford good facilities for taking out ore. The company is now engaged in building a 20-stamp water-power mill, which will be completed in a few weeks. The Comet bids fair to become one of the leading mining properties in the county.

Adjoining the Comet, and of the same general formation, is the Douallen and Hagerman mine. It has been profitably worked for several years, the ore being crushed in a 5-stamp mill.

The Gottschalk mine has a shaft 150 feet deep. But little work has been done upon it the past year, although with proper development it would undoubtedly prove a good mine.

The Bode and Wallace has produced some rich rock, but the vein is bunchy and is not being worked at present.

The Rathgeb mine and mill located near Lower Calaveritas has been worked for years and is productive.

Other important quartz mines in the district at present idle are the Pioneer Chief and Thorpe.

There are quite a number of productive gravel mines in the district, most of them being worked upon a small scale. Among the largest of the hydraulics are those operated at Worth's Hill and Pine Peak by Chinese. No special mention of these gravel mines is required, all having the same general characteristics. Aside from those mentioned the productive mines are the Mexican, Campbell, Yankee Camp, Hedrick, Bennett, Solari, and Rancola.

Douglas Flat district.—The mines in this district are exclusively gravel and comparatively few in number.

Among the more prominent claims is the Ohio, a mine that has been successfully worked for years by sluicing and employs four men.

The Rising Sun, a claim recently opened, has four shafts varying from 30 to 120 feet in depth. It is now being worked from a tunnel.

Other mines are the Take What's Left, Texas, Wild Goose, Thomas, Spiritual Resort, Duck Bar, Fairview, &c.

At Batchelor's Valley several shafts have been sunk and tunnels run with such good results that some parties are about opening a hydraulic.

In and around Vallecito there is but little in the way of mining going on. Several important enterprises are talked of, but operations have not been commenced. This district is soon to be supplied with water, which will greatly increase its production.

Copperopolis district.—This district, once so famous on account of its copper interests, has now but little to boast of in the way of mining matters. The celebrated Union and Keystone copper mines, which a few years since were among the most noted, being supplied with extensive machinery and giving employment to hundreds of hands, are still idle with no immediate prospect of a resumption of active operations. These mines are now in the hands of Boston parties, who simply keep the machinery on them in order. It is doubtful if, at the present price of copper, work will be resumed. But few quartz mines are in this district.

The Meritus mine has a Huntington mill, capable of crushing 15 tons of quartz per day. The vein averages about 3 feet in thickness, and is reported as paying well.

The Pine Log has a shaft 350 feet deep and a 10-stamp mill, crushing 5 to 20 tons of ore per day.

The Royal mine is paying the best of any in the district, and has a 10-tamp mill in continuous operation.

The Woodhill, owned by Hendricks & McCormack, is prospecting plendidly; 100 tons of rock, crushed in the Meritus mill, yielded so ell that the company have concluded to erect a battery on the mine.

The Hilltop, owned by Brown & Shriner, is reported to be paying ell. The ore is crushed in an arrastra.

Upon the Bonanza, located three miles northeast of Copperopolis, nly the requisite amount of work necessary to hold the claim has been one the past year.

The Pierce gravel mine is located at O'Byrne's Ferry on the Stanislaus River. Twelve men are employed. The claim has been remunerative for years.

Campo Seco district.—There is but little to report regarding this district, with reference to either quartz or gravel. Operations are exceedingly limited, being confined to a quartz claim or two and a few unimportant gravel mines. There are no new developments to report beyond the location of some mines, resources which the employment of capital alone can make profitable. A deposit of yellow ocher has lately been discovered and worked to a limited extent. There are deposits of bituminous coal in this district which might prove valuable if prospected and developed.

The principal quartz mine is the Borger, upon which considerable work has been done. A shaft upwards of 100 feet in depth has been sunk with favorable prospects.

The Lymes mine also has a shaft in the neighborhood of 100 feet in depth. There are several promising copper mines in the district, the most important of which is the Campo Seco. A shaft over 400 feet in depth has been sunk, upon which are excellent hoisting works. Large quantities of ore have been shipped for reduction.

At Camanche all of the gravel mines, with one exception, are lying idle for lack of water. There are in the district about 200 acres of gravel mining claims that will pay from $2 to $10 per day to the hand with cheap water. At present the district is dependent upon the Morrow ditch for its water supply, which is insufficient. Preparations are being made to increase it by extending the works of the Mokelumne Hill Canal Company.

One of the most important gravel mining enterprises in the western part of the county is embraced in the operations of the Calaveras Water and Mining Company near Jenny Lind. The company's reservoir, in Salt Spring Valley, has lately been enlarged, now covering 2,000 acres. A large ditch, 16 miles in length, conveys the water to the company's hydraulics, embracing 600 acres of gravel. Work is prosecuted with varying success, about 30 hands being employed when the work is in full blast.

DEL NORTE COUNTY.

J. E. Eldridge, of Crescent City, says of this county: It is situated in the extreme northwest corner of the State, and from a time prior to its organization has been the scene of a fluctuating mining industry. The most extensive work has been done upon its placers, which have produced steadily since 1851. This branch of mining has been carried on over the entire area of the county at various times and with variable results. The black sands of the ocean beach, which were formerly a prominent

factor in placer mining, have cut no figure of late, although se claims offer reasonable profit if the difficulty of saving the fine could be overcome. Elsewhere throughout the county work has prosecuted with its usual energy and with satisfactory results."

Happy Camp is the most important locality in the county, a about the only place where placer mining has received any materi from capital.

The deposits of gold-bearing gravel on the eastern slope of the you range are extensive and give promise of permanency.

Among the more prominent hydraulic mines at this place may be tioned the Bunker Hill, Wingate Hill, Happy Camp, Del Norte M Company, Muc-a-Muc, Gordon & Co., China Creek, Chutt's Claim man's Bar, Classic Hill, Daggett Hill, Morgan Point, Smith's C and Low Bar Claims on the Klamath River. The various meth placer mining are employed in working these mines. On the Kl River they are confined chiefly to hydraulicking, and at low sta water to wing-damming. The former is conducted by large comp the latter by small ones and individuals, the most numerous class known as bar miners. Here, as in almost every other locality individual labor can be made to pay, are found the Chinese in g numbers, and with their usual energy and hard labor their succe been considerable.

Of the above-named claims the Bunker Hill is the most noted, i ing been worked nearly thirty years without any apparent decre its production. The water to work this mine is brought in a d miles in length carrying 700 inches of water.

The Happy Camp property has probably yielded more than any in the vicinity during the past year, though nearly all of those in ation have done well. The placers in the western portion of the co though not so numerous as in the eastern, are of considerable import

The mines at *French Hill* are extensive deposits, and in the past yielded well. At the present time they are in the hands of Easter and small owners, and are virtually idle.

The Armand hydraulic claim has an extensive range of gravel, ample water right and good prospects. The mine had not been w for several years when work was resumed this winter, and is now actively pushed with the view of thoroughly testing the value o claim.

The Big Flat gravel mines are the most important in the wester tion of the county, and promise to equal any hydraulic mines i State. Nearly $200,000 were expended by a Boston company in e ping this mine before any gold was taken out, and before the pro came into the possession of the present owners. Under the pr management, however, an entirely different system was inaugu and work is carried on systematically and the mine is paying divid No general clean-up has been made, but partial ones have yielded thousands of dollars and have proved that the year's work will be h satisfactory.

In addition to the magnitude of its auriferous deposits, the count sesses other inducements to the prosecution of placer mining in the dance of wood and water, and in the immunity from possible litig on the *débris* question, due to the peculiar conformation of its r There are also chrome iron mines in this county carrying both gol silver. The deposits of chrome iron are numerous and very exte

The Tyson Company, of Baltimore, Md., is the only one now cuting any work in this branch of mining. The abundance of this

in other places, where cheap labor and transportation favor its production, has prevented any extensive mining for it in this county, but with better facilities these mines must sooner or later become very prominent sources of supply, as the ore is good and the quantity in sight, even in its undeveloped state, is extensive.

Quartz mines.—Several gold quartz ledges are known to exist in this county, but only one has been developed to any extent.

The Bald Hill quartz mine, situated about 12 miles east of Crescent City, has been partially developed, and has shown some very fair ore; but not sufficient work has been done to prove its continuity.

Copper ore is found in many places in the county, but nothing at present is being done with it.

Near Point Saint George the indications of coal have for many years past been sufficient to keep up an irregular search for veins, which until the latter part of the year has been attended with poor success, but borings of late have given promise of better results and a coal bed has been found. Its extent can only be shown when more fully developed.

EL DORADO COUNTY.

The review of this county was furnished by I. M. Anderson, of Placerville.

The Starlight quartz mine, located about 2½ miles south of the village of El Dorado, has a shaft down on the lode to the depth of 200 feet. This mine has a 4-foot ledge and has produced some rich ore.

Some very rich ore has also been taken from the Independent, north of the Starlight. Work is progressing satisfactorily, and a ledge 4 feet in width, recently struck, shows considerable gold.

The old Pocahontas mine at Logtown and the El Dorado and the McNulty are idle.

Harper and Harness have discovered a new lode about half a mile east of Logtown and sunk a shaft on it about 70 feet deep that prospects well.

On the Springfield, the representative mine on this belt, the proprietors are sinking a new shaft, building a new mill, and getting the mine in shape to work systematically.

The Spanish Creek quartz mine, owned by Jos. Ganiblin, has a 3-foot ledge, from which about 100 tons of rock have been recently extracted. A 5-stamp mill has been erected, and it is believed the rock will pay well.

The Volcano copper mine, located about 3 miles northwest of the village of Fairplay, is a large lode containing some silver. It has not been worked for several years.

The Hale placer mine, which paid largely some years ago, is being put in shape to make a run.

J. S. Claypole has located some ground on the ridge on the north side of Cedar Creek, about 1½ miles southeast of Fairplay, that gives promise of being good diggings.

The Barney placer mine, about ¾ mile southwest of Fairplay, is being worked on a small scale.

The Rosecrans quartz mine, located about a mile north of the village of Garden Valley, has been running regularly for a year or two until a few months ago, when, for some unknown reason, it shut down.

Other mines here are being prospected on a small scale. Mr. J. Johnson is prospecting a mine north of the Taylor and taking out some rich rock.

N. D. Burlingham has a mine near Garden Valley which he thinks will prove a good property. He has prospected it by a tunnel run into the hill intersecting the lode about 50 feet below the surface, at which point the lode is 28 feet wide.

The Revenge quartz mine is looking well. A 5-stamp mill was erected last July and 500 tons of rock have been crushed, yielding $3,007.55, about $6 per ton.

The Schiavo, the Miller, the old French claim and the old Spanish claim near Greenwood are being worked on a small scale.

The Cherokee Flat mine, 4 miles from Greenwood, has a ledge varying in width from 2 to 20 inches which mills $300 per ton. This ledge is tapped by a tunnel 500 feet above the bed of the Middle Fork of the American River. The length of the tunnel is 60 feet, and the drift along the vein is 230 feet, showing ore all the way. There is also a large parallel vein, 60 feet in width, which mills $6 per ton. A 3-stamp mill is on the property, which is used to reduce the ore from the rich vein.

The Mamaluke quartz mine, located about a mile west of Georgetown, has been prospected by a shaft.

The Le Bouf and England, adjoining, owned by the same parties, has been prospected by shafts and a tunnel run into the mountain to intersect the lode at the depth of 100 feet.

The Golden State quartz mine, located about 2½ miles northwest of Georgetown, is being worked on a small scale.

Georgetown.—Georgia Slide mines. The Blue Rock mine has a formation peculiar to all the mines in this vicinity, that which underlies the surface being slate with seams of quartz, rich in gold and gold-bearing sulphides. The course of these seams are northwest and southeast, and invariably dip to the north, their average distance apart being about 6 feet, and from 1 to 4 inches in thickness. The mine is owned by three parties. They work their ground by running open cuts into the hill, the longest cut being about 300 feet, depth at the terminus 150 feet, average depth 80 feet, and average width 150 feet. In running this distance they cut through about 70 of these quartz seams. The work was prosecuted by picks, bars, and powder, and the dirt and rock washed into sluices. The men do not average over 7 hours per day at the mine during the year.

The Beatty, consisting of four undivided interests, adjoins the Pacific on the south, and contains 37 acres of ground. This mine was located in 1853, and worked at intervals up to 1868, since which time it has been worked constantly on the same plan as the last mentioned, except that hydraulic power is used for washing down the bank. The mine is being worked by four men, and pays well. This mine has yielded upward of $150,000, and Washington, which is now a part of the Beatty, has yielded upward of $30,000, making a total of $180,000 for this property; only 2½ acres out of the 37½ belonging to the mine having been worked. In running the cut in this mine, 400 by 200 feet, they cut through from eighty to one hundred of these gold-bearing seams, all of which can be seen, and nearly all dipping north. Their expenses are necessarily light, as they own their own water and water-ditches. This company has an old-fashioned 10-stamp mill, but have not used it for several years. By this crude style of working, this mine has yielded $5,000 to $7,000 per annum.

The Pacific mine, adjoining the Blue Rock, consists of 604 acres of ground owned by three men who have worked it continuously since 1866. The mine presents the same characteristics as the Blue Rock, and is being worked on the same plan in every respect. The last clean-

up from a six weeks' run was about 50 ounces of gold, worth $900, produced from the labor of three men. The books of George H. Barklaye, who purchased all the gold from this mine for eleven months, show a total of $4,365. The sluices of the Beatty, Blue Rock, and Pacific companies tail to the north and discharge their tailings into Cañon Creek; each of these companies has immense piles of tailings, comprising thousands of tons, all of which are believed to be very rich, from the fact that a large amount of the gold-bearing quartz and sulphurets, which they have not attempted to save, constitute the bulk of the dumps.

The Parsons mine adjoins the Beatty on the south and is owned by Mrs. Parsons, who has it leased to Mr. Hanson, he paying one-tenth of the gross receipts to the owner. The mine is worked on the same plan as the Beatty, viz, by an open cut into the hillside. A shaft was sunk on this claim to a depth of 120 feet and drifts run in different directions therefrom, showing a large number of seams carrying free gold and sulphurets much richer than any encountered above the water-level. They have a 10-stamp mill of the oldest pattern, entirely out of date, and almost valueless.

The Lincoln mine adjoining possesses the same characteristics as the preceding mine, and has been worked in a similar manner.

Cañon Creek claim consists of 25 acres, located in Cañon Creek, and is 2½ miles in length by 200 feet in width. This creek was worked in the early days of mining, and paid very well, but since 1864 it has not been worked. The cañon has been filled up, to a great extent, by tailings from the Blue Rock, Pacific, and Beatty mines. A project is being talked of in connection with this claim which, if carried out, will produce a large amount of gold. It is simply to put long, wide sluices into the cañon and hydraulic down this immense body of tailings.

The Pyramid quartz mine is about 9 miles west of Placerville. Some years ago a company undertook to work it, and erected a 15-stamp mill, but the ore paying only $3 or $4 per ton, and the owners knowing nothing about the value of sulphurets, work was soon suspended. One of the owners, however, believing that the mine could be made to pay, secured a controlling interest, and in July last procured a boiler, engine, &c., and fitted up a 5-stamp battery for prospecting purposes. The ledge is 50 feet wide, and a shaft 8 by 12 feet has been sunk in the center of it. The success of the latest crushing induced the owners to put in a hurdy-gurdy wheel to run the 5-stamp and Frue concentrator already in position until spring, when, upon further development of the mine, such improvements will be added as the mine will warrant.

The Mount Pleasant quartz mine continues to pay as usual, averaging about $15,000 per month, and employs about thirty men, and has the rare merit of being a perpendicular lode; the lode is in or near the shaft to the depth of 650 feet, not being more than 11 feet out of it at any place.

The Melton mines are being put in shape. The shaft is sunk to the depth of 186 feet, and a tunnel is being driven on the lode into the mountain, which, when it reaches the shaft, will be 200 feet below its bottom. The lode in the tunnel varies from 2 to 4 feet in width, and the rock works about $30 per ton.

North of the Melton mines is the mine owned by Benjamin Bullard, jr., who is driving a tunnel into the mountain to intersect the lode at a great depth. He reports the prospects for a good mine as very flattering.

On the north side of the river the Mount Hope and Ohio quartz mines are idle.

The Ibid, south of the Ohio, has not been prospected very much, but the ore shows well, and there is a well-defined lode.

The Trinity placer mine is located about 3 miles southwest of the village of Grizzly Flat. This mine is on a mountain, and a lead of gravel underlies the cement between the cement and the bed-rock; the ravines on either side of the mountain have all been rich in gold, and as far into the mountain as they were worked good pay was found. It is believed if the mines were opened to the center of the ridge a very valuable property would be found.

The Alhambra quartz mine is located about three-fourths of a mile east of Spanish Flat, a 5-stamp mill has been put on the mine the last summer, and the rock crushed yielded nearly $30 per ton.

Rich rock has been taken out of the Atlanta quartz mine southwest of the Atlanta, but it was only worked about 50 feet, when water was encountered.

The Saint Lawrence quartz mine, that formerly paid for a long time is lying idle.

The Gopher-Boulder quartz mine has recently been purchased by an eastern company, and they have begun operations, and intend to open the mine and put it in shape, so as to keep the 20-stamp mill running constantly. It is supposed to be a good property, but has not been thoroughly prospected. The parties who have taken hold of it now have the means and propose to ascertain its real value.

The Crystal quartz mine is about a mile north of Mendon. The mine is under the management of L. L. Alexander and is being put in shape to take out rock rapidly as soon as the tunnel reaches the lode, when they will have about 200 feet of ledge to stope out; the rock in this mine is good and has always paid well.

The Independence quartz mine is on the Middle Fork of the Cosumne River, about a mile above the Crystal. It has recently been purchased by an eastern company, who repaired the mill and uncovered a lode about 3 feet wide on the north side of the creek. The rock works about $30 per ton, and the indications are good.

The placer mine of Henry Edner, on the creek, about one-fourth of a mile above Mendon, continues to pay about $10 per day to the man. The creek is very flat and the dirt does not run off as fast as could be wished.

The Parker Brothers have located a quartz mine about 3 miles east of the Crystal, on which a shaft has been sunk 125 feet on a lode about 3 feet wide, which prospects well.

The Pilot Hill quartz mine is situated on the mountain of the same name. The ravines having their source in this mountain were found to be rich in gold, which led to the belief that a rich mine existed on the peak. A vein of quartz about 3 inches wide was found and a shaft sunk 50 feet, the vein widening to 18 inches; water, however, was encountered and work discontinued. Another shaft was sunk on the same vein, and at 54 feet a vein of quartz 18 inches wide was found, but water again interrupted development. A tunnel is now being run into the mountain which is expected to tap the lode at a depth of 400 feet and which may encounter other veins before reaching the Pilot Hill vein.

The Grand Victory quartz mine shut down about the first of December for the winter; it will probably start up in the spring with force enough to keep its fifty stamps running constantly. The ore in this mine is low grade, but the facilities for taking it out and milling it are such that it pays very well to work. The Pacific and the Oregon, Ic

cated at Placerville, and belonging to the Placerville Gold Quartz Company, are lying idle on account of litigation.

The Keegan, located in Placerville, prospects well, but has only been sunk 100 feet.

The True quartz mine, on the south side of Big Cañon, has been prospected by a tunnel and shaft; the lode varies in width from a foot to 2 feet, and the ore is low grade, working $8 per ton.

The Enterprise quartz mine is east of the Hannon and runs parallel to it. It has been prospected to the depth of 70 feet, and the lode runs from 2 to 4 feet in width, and bids fair to become a good milling mine.

The Gosman quartz mine, adjoining the Enterprise, has been prospected to the depth of 50 feet with a tunnel, and gives promise of being a valuable property.

Placer mines.—A tunnel has been started to develop the Hook and Ladder gravel mine.

The Benfeldt, adjoining the Hook and Ladder, is being prospected for another bunch of gravel with indications of success.

The Kum Fa lies between the Hook and Ladder and the old Robinson mine. Work on this mine is temporarily suspended; the parties managing this mine also have in hand the old Robinson mine, in which they are prospecting for another bunch of gravel.

The Computer and Jess gravel mine remains idle waiting for developments in the adjoining mines.

The Bobby Burns quartz mine, about 6 miles east of Placerville, has a shaft sunk on it, and the lode varies from 18 inches to 3 feet wide, and is reported to have prospected well.

The Saint Louis quartz mine is in the vicinity of the Bobby Burns, and shows well as far as prospected.

A small force of men is kept at work on the old Prospect Flat placer mine, prospecting for another bunch of gravel, several of which have been found in this mine, some of them very extensive and rich.

The Cedar Spring gravel mine is a representative mine, and has been worked for thirty years almost continually, employing thirty men part of the time.

The Oak Ranch gravel mine, 3 miles northeast of Placerville, is owned by the Gregory Brothers, and has been worked constantly for twenty years, and the outlook now is better than for years. There is a bed of gravel 4 feet deep that pays well and gives promise of being very extensive; the gravel is cemented and has to be crushed. A 10-stamp steam mill and hoisting works are on the mine.

The Ward and Lowes gravel mine, adjoining the Oak Ranch, is being worked through a tunnel, and pays moderately, with prospects for a fine body of gravel, as it is near the deep channel.

The Toombs placer mine, located north of the Ward and Lowes, is being worked successfully.

The Roanoke gravel mine, adjoining the Toombs, is owned and worked by Hopkins & Co.

The Italian gravel mine has been worked for many years.

The Elf gravel mine is employing about 30 men a day, and the gravel pays well, with a good outlook for the future.

The Green Mountain, about a mile from Placerville, has been worked for twenty years constantly, with fair prospects for the future.

The El Dorado Water Company's mine is being worked with a small force of men.

The Reed and Coffin gravel mine, about a mile south of Placerville has been worked almost constantly for twenty years. West of this is the

Aldusen and Co.'s placer mine and the Buckeye gravel mine, worked i limited manner.

Shingle Springs.—The Crystal quartz mine, about 4 miles southeas Shingle Springs, the terminus of the Placerville and Sacramento Val Railroad, is a patented claim 1,400 by 600 feet. One shaft has b sunk on it 300 feet on the lode, another 150, and a tunnel run on lode 350 feet. The ore is low grade, averaging from $3 to $10 per t It has a 10-stamp water-power mill, with four Frue concentrators, r breaker, self-feeder; in fact, a modern mill. It costs $1 per ton to m the ore, and 45 cents per ton to mill it. The mill crushes 4 ton ore per stamp in twenty-four hours, employing from 20 to 30 men ab the mine, and 3 men at the mill. A large amount of work has b done on the mine within the year; the shaft that was 50 feet deep been put down to 350 feet, the 150-foot level has been extended 200 f and the 300-foot level 100 feet north and 50 feet south; 8,000 tons h been taken out and milled, and many substantial improvements ma New steam hoisting and chlorination works will be erected during year. The ore carries from 10 to 15 per cent. of sulphurets, which now worked at custom chlorination works. The mine is one of gr size and large promise.

The New Chicago quartz mine is about one-fourth of a mile southe of the Crystal. It has two shafts sunk on the mine to the depth of 60 a 80 feet, respectively, and they are still sinking, with flattering prospe

The Backbone quartz mine, located about one-half mile east of t Crystal, is looking well.

The Barnes is the representative mine on what is known as the Gre stone belt, and has paid well through the year.

The Tuck quartz mine and Cram and Co's. quartz mine are being su with fair prospects.

The Pelton placer mine has been worked for many years, also t Spong placer and the Cayle and Coin placer mine whenever water c can be obtained.

The old Pocahontas, at Logtown; the Taylor, at Gordon Valley; t Eureka and Woodside, at Georgetown; the Eagle King, at Grizzly Fl and the Christian placer, in the same locality; the Stillwager, near M don; the Griffith, Reed, and Bryant, near Diamond Springs; the Pove Point, American, Rhoades, Harmon, Van Hooker, Gross, the Ent prise, the Gosman, the Hardscrabble, the Sheplar, the Guignac, and t El Dorado Water Company's gravel mine have all been idle during t year.

The Oro Fino is turning out 18 ounces of gold daily; both mine a mill are run by water-power.

The Union mine, on Webber Creek, has attained a depth of 100 fe horizontal length of exploration, 150 feet; average width of vein, feet; depth of shaft, 100 feet. It has a 10-stamp water-power mill; costs $2 per ton to mine and $1 per ton to mill the ore. The mill crus 2 tons per stamp every twenty-four hours, and employs 8 men about t mine and 4 men about the mill; the mine was opened in 1884, and shafts sunk, each 100 feet; 150 feet of drifts were run, hoisting wo erected, mill-roads built, a tunnel run about 500 feet, and many i provements made. Present conditions are excellent.

FRESNO COUNTY.

The mining interests of this county are improving. Develòpme have been made in the mines in *Fine Gold district* and in the vicinity Fresno Flats, and some good leads are known to exist on this side the San Joaquin.

The Mount Raymond mines are attracting attention. Recently the San Pedro Company shipped from one of the Mount Raymond mines 80 tons of argentiferous galena, which, worked by smelting process, gave a yield of $50 per ton. Silver seems to be the leading metal in all the quartz mines of this county. The mineral belt through Fresno County varies in width from 3 to 5 miles, and lies in different formations. The main placers in early days were in the gulches which headed against this belt. The gold is of good quality; $19 per ounce and coarse. The next belt is on Potter Ridge. It is very pure slate; soft, with large ledges of iron rock running through it, which are good indications of rich deposits.

Coarse Gold Gulch is 36 miles from Madera. The mineral interests of the gulch are not late discoveries, having been worked more or less for a few years past. The past summer has been one of universal activity and prosperity.

A French company has commenced work on the Quartz Mountain mine, and will commence the work of putting up a 100-stamp mill at once. A 25-mile water ditch, with a capacity for carrying 6,000 inches of water, is to be brought in from the North Fork of the San Joaquin. The company has about one hundred men at work, and expects to increase the force as occasion demands it.

Other mining properties in the vicinity of the above are working on full time, and with satisfactory results.

McKinney & Rule are pushing their property, the Last Chance, and, in addition to keeping their own 10-stamp mill going, have sent a ton of highly mineralized rebellious ore to San Francisco for smelting. They have opened up a large quantity of ore of this character of late, and the returns on the recent shipment are anxiously awaited by the entire gulch. The ore they are milling at the home mill averages $20 per ton.

The Texas Flat Company is running on full time, as also is the Hawkeye and Long & Davidson.

The Constitution is looking well and has a vein of paying ore at the bottom.

The Surprise is being regularly worked and on a good paying basis. The mine is worked to a depth of 200 feet, showing a 6-foot vein of ore which mills about $18 per ton, with about 3 per cent of sulphurets, worth $300 per ton. The company own a 5-stamp mill, and have produced $10,000 in the past year.

The Gambetta lies 1,200 feet north of the Surprise, and since the completion of their mill has entered the list of producing mines. The formation and general characteristics of the mine are similar to the Surprise.

The Fresno Enterprise mine and mill has been idle during the larger portion of the past year, but has recently been started up and is now producing.

The Lucky Bill mine has a shaft down to a depth of 80 feet, with levels run 45 feet. The vein is what is known as a kidney vein and produces very rich ore. Some ore has been worked during the past year which has yielded well.

HUMBOLDT COUNTY.

Martin's Ferry.—The producing mines at this place are the Peckwan, Shelton, Young, Tuley, Campbell, Witch, and Saint's Rest, and are all worked in a small way. These are the only mines on the Klamath from its mouth up to a mile and a half above the mouth of the Trinity.

The Young mine, on the Klamath River, has always paid well, although worked by the owner, Mr. Young, on a limited scale by the hydraulic process. He says the Peckwan mine, 7 miles below, on the river, in which a number of Eureka people are interested, is a good mine.

This has been the shortest season ever known in mining circles on the Klamath. The snow last winter on the low hills soon melted, and very little fell on the high mountains. Consequently the water supply was very short; but the mines paid well as long as they could run.

Orleans.—The Big Bar hydraulic mine, at this place, has produced well during the past season, and for the past ten years has been producing regularly. The claim is supposed to cover an old channel of Klamath River and comprises about 57 acres of ground. The unworked ground, which is covered by the water now being used, will last at least twenty years.

The Camp Creek placer mine, has never been worked down to bed-rock, only 20 feet of top gravel having been taken off, while it is said that there are 40 feet of pay gravel before bed-rock is reached. The hydraulic claim of Markuson & Knudson has been a regular producer for several years, including 1884.

China Flat.—Some hydraulic mining is being done at this point. C. H. Waterman is operating his mine and is producing fairly.

The Black Hawk hydraulic mine has accomplished little in the way of producing bullion, the work having been principally in opening the mine.

INYO COUNTY.

Although much exploration and development have been made in the mineral deposits of this county, considerable areas are as yet untouched, and their value unknown. In addition to this, in both of the mineral belts, which lie on opposite sides of Owens Valley, there are many well-known gold and silver bearing ledges that are not worked. These in many cases contain what would in other counties be considered high-grade ores; but numerous richer deposits have thus far engaged all the capital invested in the county. Ores which would, if worked upon the ground, yield large returns, have to be shipped long distances for milling and reduction purposes.

Bishop Creek mining district lies on the western slope of the Inyo range of mountains, Bishop Creek Station in Owens Valley, being the shipping point for the district. This district has in former years been but indifferently prospected, but during 1884 considerable work was done and a better showing made.

The Polita, the leading mine, has been extensively developed. The main incline shaft is down 390 feet, from which drifts have been extended several hundred feet north and south. The vein varies in thickness from 1 to 9 feet. It lies entirely in limestone, and is peculiar in that the ore is entirely gold-bearing, while silver alone is usually found in this formation. Several hundred tons of ore have been shipped from the mine and reduced at the Hawley mill at Keeler City, yielding about $40 per ton. From ten to fifteen men have been employed during the year at the mine.

The Casey Mining Company owns 10 locations, situated a mile and a quarter northwest of the Polita, and 5 miles by road from Bishop Creek Station. The country rock formations are slate and limestone. The claims are opened by three shafts and four tunnels, the longest tunnel being 265 feet. Thus far several ledges bearing free-milling gold ores have been struck, and the prospect is considered very encouraging.

Assays taken from the first-grade ore average $60 per ton. Ten men have been worked during the year, and if upon further development the claims prove rich and permanent, reduction works will be erected.

The Blue Bell mine is about 15 miles east of Bishop Creek Station, and lies near the summit of the Inyo range. A tunnel has been run, cutting the ledge at a distance of about 300 feet. The country rock is limestone, and the vein carries the argentiferous lead ores peculiar to this belt. Assays run from $20 to $200.

During the past few months work has been resumed upon the Golden Wedge mine, with the intention of thoroughly prospecting it.

The Sacramento mine is being operated, and small quantities of rich ore have been extracted during the year. A clean-up of ore from this mine, about 20 tons being crushed, yielded 64 pounds of gold bullion, valued at $5,000

In *Deep Spring district* are many silver and lead bearing veins, some of considerable size and extent. The ores, however, are base, containing arsenic and antimony. Gold-bearing quartz veins have been lately discovered, but are as yet little developed.

The Seventy-Eight is the leading mine from which is produced the greater part of the ore reduced in the Greely mill. The vein varies from 12 to 30 inches in thickness, and yields ore easily extracted and reduced. From five to ten men are employed. Wagon roads have lately been built to facilitate the hauling of the ore from this and adjacent mines to the mill.

The Pioneer mine has been developed, and a vein from 2 to 3 feet thick exposed, bearing gold, silver, and copper. The ores assay $80 per ton in silver, the amount of gold in the ore being small. Four men have been employed during part of the year.

The Golden Cave mine has been yielding a small quantity of high-grade ore. During the summer six men were employed developing the mine; the ledge worked was 2 feet in thickness.

The Gold Coin mine has produced small quantities of rich gold-bearing ore, which has been worked in arrastras. The vein is very small and runs irregularly.

The Sam Piper mine continues to produce rich gold-bearing rock.

A shaft 120 feet deep has been sunk in the Trade Dollar, and a considerable quantity of silver ore extracted and shipped, which yielded $38 per ton.

On the Cinderella mine little except assessment work has been done.

The Oriental, Half Dollar, Indian Scout, and Red Lion mines have been little worked, but are considered good claims, and when the Greely furnace, now in course of construction, is completed, their ores can be profitably worked.

Sylvania district is situated in the northeastern corner of the county, about 40 miles from the railroad. The country rock is principally limestone, though some syenite is found.

The Uncle Sam mine has been worked to a small extent during the year, deepening the main shaft.

The Stamfeldt property, consisting of a number of well-opened mines, has been idle most of the year. Considerable ore is in sight, and the mines are considered valuable.

Several small claims have been prospected, and show promising veins of ore. A furnace of large capacity is needed in the district, as the ores, hardly paying expenses when shipped, might on the ground be profitably worked. A custom smelter would be a remunerative enterprise.

Big Pine or *Pine Mountain district* adjoins Deep Spring district o the south and lies in a limestone formation.

In the Roberts mine from six to ten men have been employed takin out ore for shipment to San Francisco. The ore is a galena, runnin 80 ounces in silver and 55 per cent. lead. Some carbonate ore, whic does not pay to ship, is being saved for reduction at the McMurray fu nace at Deep Springs.

There are quite a number of locations in the district on which onl assessment work has been done.

Kearsarge district is situated on the eastern slope of the Sierra N vadas, about 10 miles from Independence, the county seat. The or found are free milling, chiefly silver chlorides.

The Potosi is the richest and most extensively developed mine. I ores run from $100 to $120 per ton.

The Rex Montis, a mine of the Potosi series, on the 400-foot leve has a 6 foot vein of milling ore.

The Shawmut carries a still larger vein, though hardly as rich.

The Kearsarge Company own a series of mines, of which the Vi ginia is considered the best. During the year a few men have been work taking out ore. Samples of this assayed in San Francisco abo $400 per ton.

The mines of the Silver Sprout Company are as yet poorly develope

All these mines, although containing high-grade ores, have hard given the returns expected, on account of inaccessibility, cost of mi ing, packing in supplies, and the high cost of milling. The Kearsar and Potosi both own 10-stamp mills near the mines, which have be run during the year. An agent of an Eastern corporation has been in t district buying up the most promising mines. The company propos to put up a 20 or 30 stamp mill in the summer of 1885, with a view more extensive operations.

Union district is situated in the Inyo Range, south of and adjoini Bishop Creek district. The only mine of importance now being work is the Montezuma. Most of the work during the last year has be cross-cutting. A ledge of considerable width has been opened and se eral hundred tons of ore extracted. The ores are argentiferous lea but on account of containing only about 25 per cent. of lead and so manganese their reduction is difficult. The ore from the mine is r by a side track to the Elna furnace, situated on the line of the Cars and Colorado Railroad, about 2 miles from the mine. Here a 30-t smelter has during the past year made several successful runs. O are cheaply reduced, fluxes of iron and lime being found in the neig borhood. The fuel, consisting principally of coke, is shipped from S Francisco. During the latter part of the summer refining works ha been constructed, enabling the company to refine their bullion at t furnace. Freight charges are thus materially reduced, and the lead saved to assist in the reduction of ores too poor in lead to be smelt by themselves. This is not necessary with all the ores in the distri as some contain a very high percentage of lead. Gold-bearing vei are also found in the district, several of which have been opened sufficiently to indicate good prospects.

Beveridge district.—In this locality are found the most import gold-bearing veins in the county; the veins coursing east and west a both continuous and rich. Many of the locations are owned by Me cans, and have been operated for a number of years. Formerly the duction was effected by arrastras, driven by mill-power, but three ye

ago a stamp mill was constructed at Lone Pine, where the ores have since been reduced for a percentage of their assay value.

The Keynote, the most important mine of the Beveridge series, has been steadily developed, and as steadily yielded good returns. The tunnel, in 900 feet, still continues to meet pay ore.

The other mines in the group are the Quervon, Cachora, San Antonia, Santiago, Vivora, Ibex, and Julia, the veins of which are small, but the rock is easily worked, and they have thus far been developed with profit.

The following is a statement furnished by the superintendent of the Lasky mill, which comprehensively shows the amount and value of the ores crushed in the mill during the last run, which continued during September and October:

Name of mine.	Pounds.	Ounces.	Value.
Keynote	128,000	180.40	$2,520 00
Do	55,457	71.00	994 00
Do	21,100	16.75	234 50
Do	8,800	17.68	247 52
Do	1,845	3.75	55 00
Do	31,185	67.50	945 00
El Plan	22,175	23.33	340 62
Vivora	18,170	26.35	342 55
Do	23,000	12.60	163 80
Ibex	6,760	3.62	50 68
Julia	14,934	16.50	231 00
Quervon	11,480	13 25	185 50
Cachora	10,460	8.50	119 00
San Antonia	16,415	8.25	115 00
Santiago	5,135	2.25	31 00
Total	374,886	472.54	6,576 07

In September a good prospect was struck in the Golden Reef mine, owned by Mr. Nixon. A rich gold-bearing vein, some 12 inches in width, has been opened, and the indications are that the vein will increase in size as the work continues.

But little work has been done upon the Broncho mine.

In the Beveridge mine the shaft has been sunk about 20 feet. The vein is about 2 feet in thickness, and the ore averages $44 per ton.

From the Laura mine in Craig's Cañon enough $40 ore has been extracted to keep the 4-stamp mill connected with the mine almost constantly at work.

A rich strike is reported from Hunter's Cañon, also in this district.

The Freeborn Cañon mines, lately purchased by Mr. Nixon, are being systematically prospected by a force of about ten men. In these mines the veins are small, but reported to be rich, some ore running as high as $1,200 per ton. A 4-stamp mill in the cañon, purchased with the mines, is to be used for reducing the ore.

Waucoba district is situated in the Inyo Range, north of Beveridge district.

Upon the Waucoba, the only mine of importance in the district, little more than assessment work has been done. The ores are silver lead, containing a small portion of manganese.

Russ district, also situated in the Inyo Range, lies to the west of Beveridge district. The formation is lime, granite, and porphyry.

The Brown Monster mine, formerly known as the Eclipse, has been developed, and a drift run north and south from the 400-foot level. The ores, argentiferous lead, run high in silver, and considerable rich ore has been shipped, netting the owners $80 per ton. This is the only mine in the district that has received any attention during 1884.

The *Swansea district* lies south of Russ district, on the eastern border of Owen's lake.

The only mine in the district upon which any continuous work has been expended is the Indiana. The ledge, although small, produces very rich ore, running $400 in silver and 15 per cent. in lead. Several small shipments of ore have been made during the year.

The Coalburner, French Flag, Flagstaff, and Swansea Belle mines have produced no ore worthy of mention, and but little work has been done to develop the claims.

At Swansea Station the Swansea Mining Company has erected a very complete and commodious 30-ton galena smelter. A successful run was made during the summer, which resulted in 200 tons lead bullion, estimated to be worth $25,000. The ores supplying the furnace were hauled from Cerro Gordo, a distance of 7 miles.

At Keeler City, the terminus of the Carson and Colorado Railroad, the Hawley mill has been in operation. The ores supplying the mill were furnished from the Polita mine, and were shipped from Bishop Creek Station.

Cerro Gordo district.—This, the oldest and richest district in the county, lies east of Swansea district, about 8 miles from the Carson and Colorado Railroad. The formation is blue limestone, lime shales, quartzite, and granite. In the limestone strata the veins carry argentiferous lead ore. At times these veins pinch out so as to be hardly traceable, at others they open into extensive chambers or fissures containing hundreds of tons of galena, as was the case in the Old Union mine. Although the veins principally contain galena, still good silver ledges are found in the Cerro Gordo Mountains.

The San Lucas mine has produced about 100 tons of good silver ore, the greater part of which has been shipped to San Francisco.

The ore is peculiar to this district, being what is called black metal in quartz matrix. The width of the vein is about two feet, and the ore assays $60 per ton.

The Guymos mine, next in the belt, has been worked by two men and ore extracted for shipment.

The mines most important, and those receiving the greatest amount of development work, are the Aries, Saint Paul, Nemesis, and Original. The Aries mine has been extensively explored. A shaft on an incline following the vein has been sunk to a depth of over 200 feet, and drifts run to the north and south. A rich 2-foot ledge was struck at the depth of 140 feet, which continued to increase in size and value as the work was continued. The ore is a rich galena, containing silver, a small per cent. of gold, antimony, and copper, not enough of the last two, however, to make smelting difficult.

The Old Union mine, so famous on account of the millions which produced in years past, lies within 500 yards to the south.

The St. Paul mine, adjacent to the Aries, farther down the Buena Vista Hill, has been worked in unison with it. A tunnel was run 80 feet and then a drift to the north. At the end of 120 feet of drift the indications were so favorable for an extensive lead deposit that a shaft was sunk 60 feet. No ore being discovered, however, a tunnel is now being opened to strike the Aries ledge to the north.

The other mines owned by the company lie a mile down the grade to the westward. Work was extensively carried on in them by a large force of men during the early part of the summer, and several hundred tons of galena extracted; the prospect not improving, however, the work was finally abandoned.

The Ignatio mine has been steadily prospected by a single man dur-g the entire year, but no ledge of any size has as yet been discovered. The Crapo mine, a small ledge almost at the summit of Buena Vista ill, has produced about 25 tons of ore, which were shipped for reduc-on.

From the Leona mine, situated on the Yellow Grade, four miles below erro Gordo, some 20 tons of ore have been extracted, averaging $80 per ton.

Mexicans and Portuguese are working small prospects, and assorting the old dumps of abandoned mines in different parts of the district, and apparently making fair wages.

In *Lee district*, north of Swansea and east of Cerro Gordo, very little work has been done during 1884. As yet no mines have been discovered which warrant the construction of reduction works, and the district being so inaccessible, the ores will not pay to ship. A large vein of copper has been recently discovered.

On the Emigrant mine, the only one of importance in the district, nothing more than assessment work has been done. The vein is 4 feet wide, and the ores assay $120 per ton.

Wild Rose district, one of the most southerly districts of the county, lies about 20 miles from Lookout. The Argonaut and the Juniata mine contiguous to it have been opened, developing a ledge about 2 feet n width, which gives an average assay of $30.

Six miles south from these mines the Blizzard and Virgin have been eveloped with comparatively good showing. The former has a small dge of rich horn silver ore. Each of the mines has a considerable nount of ore on the dump. A shipment from the mines of 10 tons to e Snow's Cañon mill produced four bars of bullion, weighing 3,400 nces. The result was so encouraging that the owners are endeavor-g to enlist capital for constructing a 10-stamp mill on the ground. ood and water are in abundance, and the mines are conveniently ached by good roads from Panamint and Death Valley.

New Coso district, south of Lee and west of Wild Rose districts, has en a large producer for several years.

The Revenue mine, having been leased from the original locators, is ing steadily developed and ore extracted to maintain the Snow's añon mill. The vein carries from 6 to 20 inches in width, the best uality of ore running $300 per ton.

In the Silver Mountain mine a force of six men is employed, mostly doing prospect work. There is on the dump a considerable amount f medium-grade ore. The ore from this region has been hauled to lancha to be milled; but timber being plentiful on the ground and the ater supply good, it is reported that a stamp mill will soon be erected, nd the ore in sight warrants the expenditure.

The Defiance mine is being prospected by a small force of men. A inze, sunk to the depth of 105 feet, passes through a continuous and ell-defined body of galena ore mixed with fluorspar. A drift from the ottom of the winze is now being driven through the same character of ock to determine the extent of the vein. Assays run about 70 ounces ilver and 75 per cent. lead.

From the Independence mine 100 tons or more of ore have been ex-racted. The vein is of large extent, and the ore contains a good percent-ge of metal. On the surface it is rich in copper, but, as in similar for-ations elsewhere, it contains lead and silver, with traces of gold. The re is being shipped to Dayton for reduction.

The Defiance furnace has been running more or less during the year,

partially on ore taken from the mines of the company and partially on custom ore. A run during the summer netted 40 tons of bullion, worth $7,500. Some method of concentrating the ores by the dry process is needed. The company shipped during 1884 a large quantity of bullion to San Francisco for refinement.

Modoc or Lookout district lies to the west of New Coso. The most important and the only mines which have received any development worthy of notice are those owned by the Modoc Consolidated, situated on the eastern slope of Lookout Mountain, about 12 miles from Darwin.

The Confidence mine is steadily producing from 150 to 200 tons of ore per month. The mine is opened by one shaft and several tunnels. Lately a vein was opened, the ore from which averaged 43 per cent. in lead, which is the highest ever attained in the camp.

The Modoc and Lookout mines have been extensively developed, and large amounts of argentiferous lead ore extracted, assaying from $60 to $80 in silver. The company own two 30-ton galena smelters; several successful runs have been made, and a large quantity of base bullion has been shipped for reduction.

Sherman district lies south of Modoc, in the Argus Range. The Argus Range Mill and Mining Company have been developing their mine steadily during the year, and have extracted enough ore to keep their 10-stamp mill in Snow's Cañon almost constantly running. Two promising veins are at present being worked by the company. The ores are silver chlorides, averaging about $60 per ton, and are very easily milled. Lately three shipments of silver bullion have been made—968 fine—aggregating $10,500. The property is becoming a steady producer of bullion.

In July several hundred tons of ore were hauled to the mill from the Argonaut mine, Wild Rose district, and the venture proved so satisfactory that large quantities more will probably be hauled from this and adjacent mines.

Panamint district is situated southeast of Modoc. The veins in the district are numerous, the ores being silver lead, with copper base. A number of locations were previously developed, but did not prove remunerative. The only mine in the district which promises good return is the Magnet, situated in the Telescope Range south of Panamint. Considerable development work has been done.

Saratoga district is situated in the southeastern portion of the county, about twenty miles from the San Bernardino County line. In this district a Chicago company have carried on extensive operations during the year. Their principal mine is the Ibex. A shaft sunk on the ledge to a depth of 80 feet is in ore all the way down. The pay streak is about 15 inches wide, and the ore assays $300 per ton. This ore is principally silver with copper and zinc. On account of the baseness of the ore it was found necessary to attach a roaster to the mill, which has only lately been completed.

In the *Resting Spring*, *Armagosa*, *Granite*, *El Paso*, and *State Range districts* no development work of any importance has been carried on. The districts contain some good veins; but on account of their distance from the railroad and the lack of water it is difficult to work with any prospect of success. Extensive beds of borax and carbonate of soda are found in the district. In the future, now that the Carson and Colorado Railroad spans the county, and mining methods and appliances are becoming more complete and less expensive, greater results may be confidently anticipated.

Ores which it was impossible a few years ago to work with profit can

with the present facilities be made to pay. Many abandoned mines have been reopened with success. The results of mining in the previous history of the county should not be taken as a measure of the future probabilities.

KERN COUNTY.

In *Kramer district* were discovered during the year a number of promising ledges bearing gold and silver. Most of the work, consisting of surface prospecting, has been done by Kilgore, Hewitt & Co., who own ten locations. On the Kramer a shaft has been sunk to the depth of 40 feet. The ledge widens as greater depth is reached, and the ore carries a greater percentage of silver than it does near the surface. The ledge at this depth is 6 feet wide. The shaft on the Belden is down 10 feet, and the ledge is 8 feet wide. J. L. Coffman and J. R. Maxey are interested in a number of claims, including the Little Wonder, Central, Coffman, and Maxey. Mr. Maxey has found a fine ledge of galena that assays high in silver. Some of the ore taken from the above mines contains considerable red oxide, from which several small bars of silver have been made by melting the mineral in a common furnace. These mines embrace about 40 locations, and are about 5 miles south of Kramer railroad station, and water has been found in two places within two miles of the mines, and can be found, it is believed, in others at a depth of about 20 feet.

Andres Rubio, who has been prospecting the discovery of antimony in Kern County, reports favorably of the mine, which is located 45 miles east of Bakersfield, in the Sierra Nevada Mountains. He states that other mines of silver and copper ore have been discovered in the same vicinity.

At *Kernville*, the only producing mine is the Tom Lane, which employs 15 men. The Sumner and the Harley mines are closed down.

White River.—The Lucky Cuss mine at this place is in operation, and has produced a small amount of bullion during the past season. The ore is free gold, and is worked by the arrastra process.

Havilah district.—But very little has been done in this district during the past year. A large number of small veins, varying from 1 inch to 3 feet in thickness, could be worked by chloriders if the expenses of milling were not so great.

The Democrat mine has been worked in a small way during the past season, and has produced a small amount of gold. It has a ledge 3 feet wide; but the expense of mining, hauling, and milling about uses up the product.

The Ophir mine has also produced a little, but it was only worked about sixty days during the season.

The Fame mine has a shaft down 600 feet, with a 2-foot vein. Some $50 ore has been taken out; but the expense of mining being so great work was stopped after three months.

LASSEN COUNTY.

The Juniper mine has opened a rich vein of quartz, about 14 inches in thickness, between the 90 and 226 foot levels. A sample of the ore in this strike yielded $1,750 per ton, and it is thought to be quite extensive.

A vein of good ore has been struck on the Gopher mine. This property lies on the flat south of the Hayden Hill.

The Lewis and Harbert, Golden Eagle, Blue Bill, and Don't Care mines are being successfully worked.

Rich gold and silver bearing quartz ledges are reported as having been struck in the dividing hills between Eagle Lake and Willow Creek Valley. There is considerable bullion produced in this county by arrastras.

The hydraulic placer mines at Coppervale have produced nearly $1,000.

The Golden Eagle and Harbert Brothers quartz mines at Hayden Hill have been moderately productive.

The following sketch is furnished by Edmund E. Dodge, of Susanville:

"There are at the present time but three mining districts in the county in which developments have been prosecuted to any extent. These are Hayden Hill in the northern central, Antelope in the extreme southern, and Lassen in the southwestern portion of the county. Diamond Mountain is the name which has been given to a somewhat prominent portion (altitude about 8000 feet) of the main range of the Sierras, which divide the waters which flow into the Pacific Ocean on the west from those that disappear in the Sink of the Humboldt on the east. Its summit is the southwest boundary line between this and Plumas County. It is situated about 8 miles south of Susanville, and for many miles each way from there the general course of the range is northwest and southeast.

When the cañons and gulches had been pretty well worked over, prospectors began hunting higher up the sides of the mountain for the source of the fountain of wealth. This led to the finding of much float quartz bearing free gold. The search for float finally led to the discovery of the Golden Gate ledge, which has been traced from the northeastern base of the mountain for a distance of nearly 5,000 feet up the side in a southwest direction nearly at right angles with the course of the mountain. The ledge matter is quartz of a brownish color, some of which is decomposed, carrying free gold.

About 2,000 feet to the southeast of and running nearly parallel with the Golden Gate is the Susanville Chief quartz ledge, which was located August 8, 1879. The first work done on it was to run a 50-foot adit to and across the ledge, which tapped it 50 feet beneath the surface. At that depth the ledge is between 4 and 5 feet in thickness with walls and general characteristics about the same as those of the Golden Gate. Ore taken from this point assayed from $6.75 to $21.1 mostly gold, with an average of over $13 per ton. After demonstrating the fact that the ledge carried pay ore, the owners went down the mountain some distance from their first workings and started an adit which they have run in a distance of 330 feet, striking the ledge when in 275 feet about 75 feet beneath the surface. At that depth the ore on a working test, showed an average value of from $4 to $5 per ton. Fifteen hundred feet to the southwest of these workings they tapped the ledge with a 50 foot tunnel, and got about the same returns from samples taken from that point. There are now about 100 tons of ore on the dumps.

About 2,000 feet northwest of the Golden Gate ledge is a spur known as the Gold Belt, which has been traced about 1,500 feet on nearly a parallel line with the Golden Gate. This was also discovered in 187- and is now owned by James Branham and H. Neff, who work it constantly. They have run an adit from the base into the mountain a distance of 300 feet, which tapped the ledge at a distance of 250 feet 70 feet from the surface. At this point the ore carries a high percentage of sulphur, for the proper working of which they have as yet n

facilities. From a cut on the ledge at the surface they are extracting free-milling ore, about 25 tons being on the dump.

Hayden Hill.—The best mining district in this county, by great odds, is Hayden Hill, which is situated about 55 miles northerly from Susanville, with which place it has communication by a tri-weekly stage line. The hill on which most of the mines are located is obling in form, about a mile in length, and is about 6,000 feet higher than the sea.

A mine which has thus far been one of the largest bullion producers on the Hill is the Juniper, situated on the western side of the Hill, discovered and located in 1878, and has for the past five years been owned by a partnership. The improvements are a double compartment shaft 300 feet in depth and about 7,000 feet of drifts and levels, all of which are timbered in a very substantial and workmanlike manner. The workings have thus far developed a well defined clay foot-wall, but the hanging wall is very irregular and badly broken up. Another rich strike made in the Juniper has disclosed a vein 15 inches wide, and is known to extend for a considerable distance. Although Juniper has in the past made many thousands of dollars for its owners, nothing more rich or extensive than this strike has ever been found.

The Golden Eagle was located in 1878. The owners first commenced to take out pay ore in February, 1879, since which time they have hoisted about 1,000 tons. This they worked in a 5-stamp mill, built by them in 1879 on Willow Creek. In the spring of 1882 they started a tunnel from the west side of the claim, about 600 feet from the old workings, to develop the other portions of the mine. When this had been run in about 175 feet the vein was struck, on which they have drifted about 50 feet, and on which they are now sinking. From these new workings they have extracted about 75 tons of ore, which is still on the dumps, and the prospects are good for a continued and extensive yield. The ledge is well defined, having a very smooth porphyry foot-wall and a hanging wall of the same formation, but broken, and can be easily traced on the surface from the northwest to the southeast corner. Later developments have, however, improved the prospects of the property.

The vein of the Hayden Gouge, another good property, runs at a right angle to this, and intersects it about 30 feet from the main shaft of the old workings.

The excavations on the Brush Hill at the present time are two shafts, one 135 feet deep and the other 150 feet and about 600 feet of drifting and levels, from which has been taken over $100,000. At the present time the mine is looking well and constantly improving as development progresses. In connection with the mine, the Hoes Brothers also own a 5-stamp quartz mill, situated in Willow Creek, where all their ore is worked.

The Brush Hill Segregated, a portion of the old Brush Hill claim, is being vigorously worked. The amount of work done on the claim at the present time consists of two incline shafts, one 130 feet down and the other about 60 feet, and about 200 feet of drifts. The owners have for some time been running a cross cut from the main shaft, about 125 feet from the surface, to strike the ledge, and have recently discovered an extensive ledge of ore, which will average $40 per ton. They also own a quartz mill 1¼ miles from the mine at Garden City, where wood and water are abundant.

The Evening Star was first located in 1870. The workings are a shaft 70 feet deep, from which about 100 feet of drifts have been run. For the better working of the property, Mr. Hoes in 1878 commenced running a tunnel 4 by 6 feet from the west side of the mountain, which is

now in a little over 1,000 feet, and which he will continue for some distance yet. Early in January, 1883, he struck a body of ore, which has been developed until the property has become a fine prospect. None of the new discovery has yet been worked. The vein is from 5 to 25 feet in thickness, and the course has not been ascertained, although they have run on it for 70 feet or more.

The Don't Care, situated on the southeast side of the hill, was located in 1878. Two shafts have been sunk on the claim, one 90 and the other 110 feet; also, a 200-foot tunnel and drifting, stoping, &c., amounting to 800 feet. Most of this work has been done in extremely hard rock, making it very expensive. Pay ore was first developed May 26, 1880, since which time they have extracted and reduced by mill process about 250 tons, which averaged $30 a ton, 97 per cent. gold and 3 per cent. silver. They now have on the dump ready for reduction about 80 tons, which will average $40, besides hundreds of tons that will average $5 per ton. Excepting the Juniper, this claim has doubtless produced the best ore of any mine there.

The Lone Star, generally known as the Hayden Gouge, is situated on the southeast side of the hill. There has been run on this claim over 1,000 feet of shafts, tunnels, and drifts, all of which are in good shape. They now have a large quantity of ore on the dump which will average as much or more than any that has yet been reduced. It was but recently that they got the ledge opened up so they could work advantageously, and now their prospects are very flattering for a continuous yield of pay dirt.

The Providence has a good whim and large whim-house on the property and all conveniences for working.

The Hornet has a shaft down about 75 feet, from which have been run about 125 feet of drifts. The hoisting is done with a derrick, the only one on the hill. There is a well-defined ledge about 2 feet wide, which has yielded 80 tons of ore, averaging $20 per ton. Development is actively prosecuted, with all the men that can be worked advantageously.

The Lightning has a tunnel in about 260 feet, which is expected to tap the vein 100 feet beneath the surface.

The Defiance has a 60-foot shaft and tunnel 150 feet.

The Golden Reef has a 40-foot shaft and cross-cut 50 feet. From the bottom of the shaft they drifted 175 feet, but have not yet struck the ledge.

The Mahogany and the Wild Irishman are being constantly worked.

The Blue Bell has yielded $2,000 while sinking an 80-foot shaft and running 120 feet of drifts and winzes.

The Crystal has 110 feet of shafts and drifts, and they are now prospecting for the ledge in a tunnel 250 feet long, which will be run 50 feet if ore is not found in less distance.

On the North Bluff claim they have sunk and drifted 50 feet on a ledge from 12 to 20 inches in thickness, in which the ore averages $ per ton. They are now running a tunnel by which they will tap the ledge 150 feet deep. The prospects are good.

The Excelsior has two shafts, one 90 and the other 40 feet deep, and from the first a drift 120 feet long.

The Nebuchadnezzar is being prospected.

The Morrow is being worked by a tunnel, which is in about 75 feet with good prospects.

The Lewiston Tunnel has been run 200 feet, cutting three veins, all which show good indications.

LOS ANGELES COUNTY.

The Sanchez and Soledad Gold and Silver Mining Company is developing its property. The ore is said to assay from $20 to $1,000 per ton.

The Kelsey mine is the property of the San Gabriel Mill and Mining Company, and is located in the San Gabriel Cañon, about 25 miles from Los Angeles. It is situated on the mountain side at a considerable elevation above the bottom of the cañon, and the company has constructed a trail so that they can have communication with the mine at any stage of water. The ledge has an average width of 3 feet, and the ordinary grade of ore runs from $20 to $40 per ton. A good force of men is running a tunnel and opening the mine, and if the prospect continues as favorable as present appearances indicate, the company will shortly erect a mill for reduction of the ores.

An important discovery was recently made 28 miles north of the city of Los Angeles. The ore is strongly impregnated with petroleum, iron, and free gold. This combination is so peculiar and unusual that probably the ordinary process of reduction will not apply, and some new method will have to be devised; as in an ordinary furnace the petroleum in the rock would likely destroy the iron before the ore could be reduced. It is possible, however, that a moderate roasting of the ore before placing it in the furnace would expel the petroleum. From the character of the country, and the vast deposit of petroleum that exists beneath the mineral rocks to the north of this city, it is evident that a large amount of the mineral-bearing rock is impregnated with oil. In the northern part of the county is a vast amount of this ore, rich in gold, and it may be impregnated with petroleum.

A ledge of graphite, of a superior quality, 40 feet wide, which has been opened 25 miles from Los Angeles, is exciting attention.

The Palomis placers, in the northwestern part of the county, have been incorporated under the name of the Los Angeles Water and Mining Company. Two miles of a large water ditch have been made in the direction of the placers, and the new company purpose to make 5 miles more, which will reach to the rich gravel and earth from which some of the finest placer gold that has ever been seen in the State of California has been obtained. When the ditch is completed the company will commence hydraulic and placer mining. Should the company make a success of their operations in these auriferous beds others will be opened in that part of the county, which is rich in coarse, fine, and nugget gold. Its existence has been known for more than forty years.

Piru district.—It is reported that ore has been discovered in the mountains between the Piru and Casteen Creeks, about 30 miles northeast of the town of Santa Paula. There has always been more or less placer mining done in this district, and always when water could be put upon a claim with paying results. The main drawback heretofore has been the impossibility of conveying the water of the Piru Creek to points where the best-paying dirt was found. The expense of transporting the dirt to the creek and washing it, in a majority of cases, exceeded the yield of the gravel.

MARIPOSA COUNTY.

F. H. Gould, of Mariposa, says of this county: Perhaps no county in the State has had more vicissitudes in mining than this. Its rich surface diggings were the first to attract attention. Their history can readily be traced in denuded flats and slopes, gulches turned upside-

down, and the network of a thousand ditches, large and small, to carr the precious water to some far-off placer. Upon the exhaustion of th gravel diggings, quartz began to claim attention. A few rich mine were opened up, when the discoveries of '49 drew off the prospectors t more promising fields.

No mine in Mariposa County, on or near the great mother lode, being worked at present. The Cook Brothers' mines—the Melvina, Ma Harrison, and Potosi—have recently been patented and are for sa but no efforts are made to work them.

Mr. Hulings is reorganizing the Mariposa Improvement Company the purpose of building a large water-power quartz mill on the Mer River, about 6 miles distant from Hornitos, with the intention of wo ing the mines near that place and connecting them and the mill b narrow-gauge railroad. If this project is effected, or if power could conveyed to the mines from the river by compressed air, the great pense of wood, which has precluded milling ore from many Horni mines, would be saved.

At Quartz Mountain, affairs are looking up. A Huntington mil building; rock is being taken out of the Washington mine, and it thought that it will soon be turning out bullion again.

Mr. Chandler is working the Campodonico mine with a view to p chase, and is refitting the mill.

During the past year Mr. Ralph Barcroft has built a 10-stamp m on his mine near Mount Gaines, but, owing to cost of wood, his rock pears not to pay, $8 to $10 per ton being its average value.

Ore which assays from $30 to $35 per ton is being taken from t Honeycomb and the Three Tree mines.

The Duncan has been steadily worked, but with poor results.

On the Mallett mine, near Indian Gulch, a mill has been erect In the bottom of the shaft, 145 feet deep, an ore-body was found which work will be resumed as soon as pipe-couplings for the pump s in place. The ground is very difficult to work in this mine, grani sand running continually through every little crack in the laggi This company is preparing to put in four new concentrators.

To the southwest the old Mount Buckingham now called the V derbilt, is in active and successful operation. A new 10-stamp m is running and concentrators are about to be put in. A large quant of ore is in sight, quite base, supposed to contain much gold, but th with more complete appliances, could be milled profitably.

Dr. W. W. Martin, of Oakland, is preparing ditches, pipes, and gia to work the Leary hydraulic mines, of which he is owner. These mi are located in Devil's Gulch, near Darrah.

Near Mariposa, the Malone mine is leased to Messrs. Varly & C who are taking out ore on shares. They have run a 300-foot tunnel tap the vein, and are drifting on the lead. A water-power 5-sta mill will soon be running.

Considerable work has been done on the Dietz, taking out and slu ing down the decomposed quartz. A great deal of quartz has be taken out from time to time, but no mill has been built.

At Hite's Cove no active operations have been on foot on account litigation.

The Hoosier has been prospected to some extent, showing ore high impregnated with sulphurets of iron and quite rebellious, althou assays have reached $100 per ton.

Mr. Trumbull has drifted 60 feet on the vein in his mine, showing

vein of rock from 2 to 10 feet thick, yielding about $20 per ton of gold treated in arrastras.

The owners of the Early mine are taking out ore that mills from $14 to $20 per ton.

Mr. Ferguson has built an 8-stamp mill, that is kept busy night and day on ore taken from his mine and on float rock gathered from the bed of the Sweetwater Creek. The Reeve Brothers are milling their share of the rock at Grove's mill.

The Golden Age has been extensively prospected during the year and work is being pushed in the 120-foot level, the ore taken out assaying $10 to $12 per ton.

On the Maggie Johnson, near Cathay's Valley, work is kept up in a small 5-stamp mill. The ore averages about $20 per ton. A 100-foot shaft has been sunk on the vein, and drifts east and west 40 and 50 feet, respectively, have been run.

The Christmas Gift, belonging to Messrs. Dickenson and Robert Helman, is still idle, though expected to start up soon.

In the vicinity of Coulterville, the Cook Brothers' mines have been patented.

On the Red Cloud, which has been purchased by San José parties, the new 10-stamp mill is running on rock reputed to pay well.

The Banderita has run part of the time, though most of the work performed was in prospecting and improving facilities for getting out ore.

The Compromise, or Marble Spring mine, has been running most of the season with satisfactory results.

The Bourdaunt has been bonded, but no work has been done.

A new mill was built on the O'Gorman, or Buena Vista, mine, and after one or two runs that cleaned up a satisfactory amount of bullion, legal proceedings shut down mine and mill, leaving the title in litigation.

The principal placer mines of the county are in the vicinity of Sherlock's.

The Breen placer is turning out well.

Mr. Schroder has made a new ditch, leading water to his placer, crossing a deep cañon by means of pipes, and is now working a small giant.

Mr. Jacoby is working his mine, on the Merced River, with pleasing results.

Red Banks is still shut down, with no prospect of again being worked.

In Chowchilla, Mr. Landrum has cleaned off considerable bed-rock with his giant, but the returns are not large.

MONO COUNTY.

Most of the material comprising the sketch of this county was furnished by S. P. McKnight, of Clinton. Quartz mining is the principal industry of this county, although for the past twenty-five years considerable placer mining has been carried on in various locations. Within the past year many ventures in hydraulic mining have also been made which give satisfactory results and are likely to expand into large operations in the near future.

Bodie district.—The Standard Consolidated, which has produced so largely in years past and regarded as one of the leading mines of the State, has been virtually closed down, only 15 men being employed in the mine, taking out ore from the old stopes and doing some prospecting on the various levels.

On the 19th of March the 15 stamps that had been employed on the ore of this mine at the Bulwer Standard mill were shut down, and on the 2d of May the Standard mill itself was silenced for the first time since its erection. This lasted for only four days, when 15 stamps were started on ore of the Standard mine and 15 other stamps on ore from the Bodie Consolidated. These 30 stamps continued crushing ore from the two mines named until about the middle of July, when, from that period until the end of the year, the entire mill was run on ore of the Standard mine, one-half of the stamps being employed in working tailings. At present there are about 300 feet of water in the lower levels of the mine, extending from the 900 to the 1,200 foot levels. The past season has been a very dull one for this mine and occasioned the first assessment in its history. The production, however, is reported to have been, gold, $267,777.16; silver, $36,517.60; total, $304,294.76. The total output of the Standard Consolidated mine from the beginning, in 1877 to the close of December, 1884, has amounted to about $10,000,000.

The second large bullion-producing mine of this county is the Bodie Consolidated. About 35 or 40 men have been employed during the year, and the value of the ore extracted exceeds that of any year in the last five years. Prospecting has been done with favorable indications on the 300, 400, and 550 foot levels. The mill, however, was closed down December 22, 1884, and the indications are that the best ore has been worked out. The shipments of this mine during the year ending December 31, 1884, amounted to—gold, $438,604.78; silver, $178,705.40 total, $617,310.18. The production of this mine since 1878 has amounted to about $4,000,000.

The Bodie Free Press, under date of February 14, 1885, gives the following statement as the bullion shipments of the Bodie district for the year 1884:

Grand total of bullion shipments for the year 1884.

Standard Consolidated	$304,294 7
Bodie Consolidated	617,310 1
Syndicate	155,244 9
New Standard	17,714 7
Bodie Tunnel	2,075 9
Wagner's tailings mill	17,600
Virginia Creek Hydraulic Company	21,300
Scattering	8,630
Bodie ore	714
Total	1,144,883

The Syndicate has been steadily worked during the past year, and has produced sufficient bullion to pay all expenses and six dividends amounting to $60,000. There is considerable low-grade ore in the mine and the prospects are good for a continued run during the coming year with results equal to the past.

The New Standard mine has recently been brought to notice by a strike which bids fair to make it a valuable property. The mine adjoins the McClinton and Consolidated mines, it being a consolidation of five locations. The mine is opened by a tunnel started near the old Bodie Bluff works, having a length of 400 feet, striking the ledge about 150 feet below the surface. The ore looks well and is worth about $ per ton. The company owns a 7-stamp mill, which is kept running night and day, reducing about 12 tons per day.

The Mono was formerly a part of the Bodie. It is showing better than for some time past; some very good ore is being taken out, but

is not opened up sufficiently to be called a strike of very great magnitude.

The Bulwer is being worked, but shows no increased production over last year, which was light.

The following mines which a few years ago were in active operation, are now closed down: Noonday, North Noonday, Bodie Tunnel, Spaulding, Red Cloud, Concordia, Adenda, Oro, May Belle, Goodshaw, Dudley, Defiance, University, Maryland, Queen Bee, King Bee, Boston, East Noonday, Glendale, Champion, South Bodie, Gipsy Queen, Consolidated Pacific, South Standard, South Bulwer, Tioga, Blackhawk, Summit, Double Standard, Bodie Bluff, and Union.

As might be expected, the closing down of the above mines has caused a general depression in business matters here, and the impression seems to be that Bodie, as a great mining camp, will soon be among the things of the past.

Clover Patch district.—This district is in the southern portion of the county, a portion of it being in Inyo. During the past season mining matters have been at a complete stand still; all the former producing mines having been closed down, and but very little prospecting going on.

Homer district.—This district is located on the eastern slope of the Sierra Nevada Mountains, extending to the summit of the range on the west. The production of this district is principally gold, the producing mines being the Gorilla and May Lundy. The latter, owing to litigation, has been closed down since July 1, 1884, consequently the production has been light.

The Gorilla is located south of the town of Wasson, on a high bluff, and is opened by two tunnels, both of which show free gold in paying quantities. The company built a 5-stamp mill the present season, which during the time it was in operation gave very satisfactory results. Owing, however, to the great altitude of the camp the heavy fall of snow puts a stop to all operations during the winter.

Lake View mine is the south extension of the May Lundy, and some good ore was taken out while prospecting.

The Bryant has also shown some fine ore and is looked upon as having good prospects for the future.

There are several claims in this district that prospect well, but will not produce any bullion during the coming season. No work will be done in the district before the 1st of May. The following information was furnished by a correspondent concerning the mines around Benton:

The ledges are represented to be very large for this region, and to contain an immense quantity of rather low grade gold-bearing quartz, estimated by those at work to mill from $10 to $20 per ton.

Some work is being done on the eastern side of the valley in the vicinity of the Queen mine that has turned out in the past large quantities of bullion.

The Reward is a very promising mine, showing croppings 100 feet in width, and giving a fine prospect for a good ore-body when fairly opened. The ore is rich in silver and lead, and assays, in some instances, as high as $3,000 per ton.

The principal mining in the vicinity of Benton, as in the past, is confined to what is generally known as Blind Spring Hill. It has yielded, in the gross, very large amounts of bullion, extracted, reduced, and shipped at a great cost to the owners, when prices for everything were very high. The mines are ranged on each side of a long high ridge,

1,200 feet above the bed of the Carson & Colorado Railroad, and over 6,000 feet above the sea level.

The old Camanche lode, running along the center of the ridge, has a slight eastern dip, becoming nearly perpendicular as depth is attained. The superintendent says he will commence taking out ore soon, and will soon be able to keep the mill running on $200 ore.

The Eastern Star has a ledge 2 or 3 feet wide of rich ore, all of which is extracted for reduction. Shipments heretofore made yielded $228 per ton. Some of the ore from this mine is exceedingly rich in horn silver.

The Borasca mine is also a good property. The vein averages 2½ feet thick, the whole contents of which are taken out, and work from $125 to $150 per ton.

The Wai Weira Mining and Milling Company expects to start up within a short time. The mine is opened to a depth of 900 feet, and has yielded, on good authority, $1,500,000.

Jordan mining district.—This district embraces that portion of Mono Lake Valley lying west and northwest of Mono Lake, together with portions of the Sierra Nevada Mountains on the west and the Bodie Hills on the north. There are several promising quartz veins in the Sierra Nevadas, which are owned by Callahan, Olsen, and others.

The Detroit Copper Mining Company has closed down, owing to the low price of copper. There is a large tract of land in this district which was worked as early as 1858 as placer mines, but not paying much unless worked by the hydraulic method, were abandoned.

The Virginia Creek Hydraulic Mining Company, however, having obtained the title to a large quantity of these old placer diggings, brought water from Virginia Creek and introduced the hydraulic system, and are working them with good results.

The Mono Lake Hydraulic Company are pushing work, but with caution and deliberation commensurate with the magnitude of the undertaking. The company has secured a title to about 4,000 acres of auriferous ground and has prospected it until convinced that a great future awaits these operations. It has also secured the right to take the water from Mill Creek and the title to Lundy Lake, which covers about 250 acres, where a large supply of water is held by a dam; also Mono Lake, which covers about 150 square miles, is to be used as a dump for the *débris*. The land owned by the company lies several hundred feet above the lake. As the lake has no visible outlet, and its waters, being of a strong alkaline nature, are entirely useless, no objection can be made to its being utilized for this purpose. The company has prospected its ground thoroughly by sinking open cuts, and is now satisfied that all of this vast tract of land will pay to hydraulic. From careful estimates it is believed that the ground will pay five cents per cubic yard, which, when the facilities for working it are complete, should prove a very valuable property. Mining men have estimated that it is possible to wash 30,000 cubic yards of earth daily when the water, ditches, and pipes are in full operation.

Mammoth or Lake district.—But very little work has been done in this district during the summer. Four men have been working upon the old Mammoth mine and have taken out some fine ore. Some work is also being done on the Lisbon mine with the prospect of opening up a good property in the near future.

Patterson district.—This district is located in what is known as the Sweetwater Range of mountains, they being a spur from the Sierra Nevada Range, about 30 miles distant from the latter. The formation is

this district is porphyry, the mines lying at an altitude of from 10,000 to 12,000 feet. The principal mines in the district consist of the Kentuck, Georgie Howell, and May Belle, belonging to the Summers Consolidated Mill and Mining Company. These mines are looking remarkably well and producing large quantities of good ore. The ores are all silver-bearing, and, in fact, all the mines of this district are of this class. The Summers Company has about 8,000 tons of ore now in sight between the lower tunnel-level and the bottom of winzes Nos. 1 and 2, which are down to a depth of 400 feet on the ledge, the ore showing better in the bottom than elsewhere in the mine. Assays average about $70 per ton. The company also owns a 5-stamp mill which started up in June of the present season and produced $34,000 up to December 21, when it was closed down for the winter.

The Silverado mine has been worked to some extent during the past season. About 58 tons of ore were worked at the Eclipse mill, which yielded $16.31 per ton. Owing to the low grade of the ore the mine was closed down.

The Homestake mine is located in the same cañon and about 800 feet east from the Silverado mine. It bids fair to become a valuable property.

During the past summer about 25 tons of ore were worked at the Summers mill, which gave a pulp assay of $60 per ton, while 3 tons worked at the Eclipse mill gave an assay of $256 per ton. The ore contains some base metal, which prevented it from working up to a high per cent. of its assay value. About 300 feet of tunnel have been run, but it has not yet tapped the ledge.

The Nellie mine lies south of the Homestake. During the past season 100 feet of tunnel have been driven into the mine and a winze sunk about 40 feet, showing a ledge from 2½ to 3 feet in width, giving average assays of $35 per ton.

Considerable work has been done on the Poverty mine, located at the head of Silverado Cañon, during the past season. It shows a ledge 2 feet wide, and some ore was taken out, 10 tons of which were worked at the Eclipse, which gave a pulp assay of $36 per ton. Work is now suspended.

The Star mine has been in operation during the past season. About 100 feet of tunnel have been run and a winze sunk 45 feet, showing a ledge 3½ feet in width, yielding ore that gave a pulp assay of $60 per ton.

The Lookout mine, near the head of Sweetwater Cañon, has an incline shaft sunk to a depth of 30 feet, showing a ledge 4 feet wide of fine ore. Work will be continued here during the winter.

The Great Western mine shows very heavy croppings, carrying some fine ore, but no developments have been made during the past season.

The California Comstock, also in the Sweetwater Cañon, is looking well for the amount of development done.

Considerable work has been done during the past season upon the Lady Hays mine, adjoining the Summers Consolidated mines, developing a large body of mixed quartz and porphyry, ten tons of which yielded $26 per ton.

The Eclipse Milling Company have a 5 stamp mill in Cottonwood Cañon, which was built during the past summer and run as a cotton mill. It started up in October, 1884, crushed about 90 tons of ore, and closed for the season for want of ore. It will be started again in the spring.

Prescott district.—This district lies southwest of Mono Lake. There are some very good prospects here, but probably none of the locations will be sufficiently developed to produce any bullion during the coming season.

Tioga district lies west of Prescott and south of Homer district, a portion of it extending into Tuolumne County.

The principal mining enterprise in this district is that of the Great Sierra Consolidated Company. They have run a tunnel into the mountain 1,800 feet, and claim to have struck a fine ledge, but they have closed up the works and apparently abandoned them. The company has expended a large amount of money in this enterprise.

The Ella Bloss mine is located on the summit of Mount Gibbs. This mine, the Golden Crown, and the Ella Bloss No. 2 constitute a group of mines which are owned by the Great Sierra Company. A shaft has been sunk to a depth of 150 feet, showing a 10-foot ledge of very good ore. These mines are all closed down for the present.

NEVADA COUNTY.

This county has for many years been the largest producer of the precious metals in the State of California, the production being confined almost exclusively to gold. Owing to the injunction placed on hydraulic mining its product has continued to fall off, but it still holds first rank as the largest gold producer of the State. Its mines are magnificent properties, well developed, systematically and economically worked, with all that modern skill and the most improved machinery can accomplish in the way of advantageous mining.

Mr. Samuel Bethell, of Grass Valley, has furnished the following review of the year's work:

Grass Valley mining district.—The seventeenth annual report of Mr. Edward Coleman, superintendent of the Idaho quartz mine, says that the year ending December 1, 1884, has been much more prosperous than the preceding. In 1883 the total product of the mine was given as $364,599.85, which gave dividends only to the amount of $34,100, while for 1884 the product has been $561,895.49, and the dividends $271,250. The average value of the ore for the past year has also been higher, being $18.04 per ton as against $12.76 per ton in 1883, and the cost of milling and mining has been $7.86 per ton, whilst in 1883 it was $8.71 per ton. There have been 31,143 tons of quartz crushed this year, an excess of 3,000 tons over the preceding year. During the year the 1,400 level has produced the principal part of the quartz extracted. The 1,500 level has been opened, but the regular pay chute not yet reached. The incline has been sunk 119 feet below the No. 15. The introduction of water power for general operations has effected a large saving over the use of steam, estimated at $30,000 for the year. The mine is looking well, and as no further extraordinary expenses are anticipated, such as were encountered in 1881, dividends for the coming year may be anticipated. The Idaho has been a grand mine in the past, and its treasures are far from being exhausted.

The Maryland is an easterly extension of the Idaho, 2,000 feet in length. Within the last year hoisting works have been erected, a 6-foot Petton wheel has been placed in position, and with a minimum amount of water at 350 feet pressure; the shaft (now being sunk 100 feet below the drain tunnel, which is 125 feet below the surface) is kept free of water, and the work is going uninterruptedly along. No quartz has as yet been extracted.

The Empire quartz mine, situated about three-fourths of a mile in a southeasterly direction from Grass Valley, continues in successful operation. The main incline shaft is down to the 1,500 level, and drifting therefrom was commenced at this depth. There is a 2½-foot ledge showing freely in gold and sulphurets. For about a month past, however, work on the 1,400 and 1,500 foot levels has been stopped by the rapid inflow of water. Additional pumps are being placed in the mine, and the water is now nearly if not quite overcome. A large force of men, tributers and others, are at work, and in almost every part of this extensive mine good paying rock is extracted. A new 20-stamp mill, worked by steam-power, has been recently erected, having Hendy rock-breakers, self-feeders, and eight Triumph concentrators, all of which work with admirable precision and give entire satisfaction. This, the oldest mine in the country, is beginning to show its richness. Engineer Bethell has been making surveys of the mine to locate and sink a vertical shaft from the surface that shall strike the present incline shaft when continued down to the 2,000-foot level.

The Magenta quartz mine adjoins the Empire on its north boundary. The incline shaft is down to the 400-foot level. During the summer some very rich rock was taken from the 200 and 300 foot levels and some remarkably rich specimens were taken from other parts of the mine. New hoisting and pumping works of limited extent and power were erected, but found inefficient, and the inflow of water from the 400-foot level stopped further operations. A drain-tunnel, however, of about 1,000 feet in length was completed to strike the incline shaft at the 200 foot level. W. B. Bowen, esq., present owner of the Empire, has since purchased the controlling interest, and contemplates the erection of larger buildings and placing therein more efficient pumps and machinery and again starting with a good force of men.

The New York Hill quartz mine, situated some 2 miles south of the town of Grass Valley, is still at work, and is reported to have recently struck a fine body of ore in the No. 10 drift south. This chute is going down without interruption to the No. 11 level. The mine ceased paying dividends a few months ago and began levying assessments. It is hoped, however, that this new find will lead to permanent and profitable workings. Quite a force of hands, some 50 or 60, are now at work, among them many tributers.

The New Rocky Bar quartz mine, adjoining the New York Hill, has been idle for the last year. It includes within its boundary lines the old, and for a season the very rich, tract of about 300 feet square known as the Ford and Mullen ground. This ground has been purchased by the Rocky Bar Company, but only a few tributers are at work upon it.

The North Star quartz mine, one of the oldest in the county, is situated about one-half a mile in a southwesterly direction from the New York Hill quartz mine. It is estimated that some $3,000,000 has been extracted from this mine. About the year 1872 it was closed, the buildings were taken down and sold, together with the whole of its machinery, although at that very time the bottom of the mine, viz, its 1,300-foot level, was yielding rock worth from $40 to $50 per ton. An immense amount of work has been done, long drifts of 1,000 feet or more, and stopings of corresponding extent, yet, as before stated, work suddenly stopped, and the mine soon filled with water to the drain-tunnel level (200 feet). It remained in this condition until the spring of 1884, when W. B. Bowen, owner of the Empire mine, effected satisfactory arrangements with the San Francisco owners, and immediately incorporated a new company, with 100,000 shares as its capital stock, which

were readily taken, and $40,000 at once subscribed as a working cap ital, and the extensive buildings and machinery of the Scotia quart mine, which had proven a failure, were at once purchased and remove to the North Star ground. Here the buildings were again erected, an the machinery with some additions put in place. The incline shaft now being cleared of its *débris*, widened in places and repaired, a steam and other pumps are rapidly reducing the water in the min Tributers will be at work immediately in drifts and stopes now abo the water-level, and in two or three months the mine will be clear water to the bottom. A strong force of men will then be set to wo and a vigorous onslaught be made on the known body of good ore in t lower levels, and new ground, of which a large area is owned by t company and secured by United States patent, will be opened.

The Peabody quartz mine, on Rhode Island Ravine, has an incli shaft down about 200 feet and a drift run northerly some 300 or 4 feet. Some very rich rock has been extracted from this mine. Sup intendent Bennallack says he has a good strong ledge of 8 or 10 inch and feels very sanguine of having a good mine. It has small hoisti works and pump run by water-power, but no mill.

The Pennsylvania quartz mine is now leased to a company of s practical miners, who are sinking the incline shaft and removing *débr* &c., preparatory to further operations of drifting and stoping. Th report favorably as to the appearance of the quartz, but none of it h yet been crushed.

The Slate Ledge quartz mine, an old mine on Wolf Creek, 4 mil south of Grass Valley, yielded well in years gone by, but subsequent remained idle until two years ago, when a new incline shaft was sun which is now down 250 feet. Drifts have been run southerly from t several levels, in all about 300 feet. The rock from a 2-foot ledge av ages $30 per ton. New steam hoisting and pumping works have be put up, and a Perrins 10-stamp quartz mill does the crushing. Twent one men are engaged in and about the mine. Its prospects for t future are good.

The Crown Point quartz mine, which has been idle for years, has be worked spasmodically the last year or two. New hoisting and pumpi works on a small scale have been erected. The incline shaft is dov 200 feet, and contracts are called for the running of 100 feet of drif A recent crushing of rock at Rogers's mill yielded about $12 per ton.

The Horseshoe quartz mine, a new mine on the left bank of W Creek, 2½ miles south of Grass Valley, has an incline shaft sunk 1 feet, from which a drift has just been started. A 2-foot ledge yieldi rock showing free gold and sulphurets has been exposed, but as yet crushing made. A "wipsey" is used for hoisting. Some of its ore h since been crushed here, which yielded $30 per load or equivalent $20 per ton. Work is now suspended for the winter.

Spasmodic workings have been carried on on the Hartery qua mine during the last two years or more. A few weeks ago some bea tiful and rich specimen ore was extracted from drifts below the dra tunnel about the 200-foot level. The present steam pumping and hoi ing works are to be removed and work for a season at least suspend It is stated, however, that better buildings and machinery will again placed on the mine and the work of sinking and drifting be resum early in the spring. The rock taken from the mine looks well and pr pects are favorable.

The Imperial quartz mine, situated on Deer Creek, has an incli shaft 280 feet, with drifts east and west 350 feet. The ledge varies fro

3 to 8 feet, showing galena sulphurets. New steam hoisting and pumping works have been provided. There is a mill of 10-stamps, run by water, with 200-feet pressure, and 7 men are employed.

The Winfield Scott quartz mine, adjoining the Hartery, has a shaft sunk to the 300-foot level, from which $25 and $30 rock have been extracted. The last reports from the mine were not as favorable.

The Alpha, Golden Gate, Tribute, Washington, and other quartz mines in this district are now lying idle.

Nevada City mining district.—The Providence quartz mine, adjoining the town of Nevada City, is pursuing the even tenor of its way without let or hindrance, producing as regularly and as handsomely as ever.

Work at the Merrifield quartz mine is steadily progressing under its new management. A temporary interruption may ensue from the fact that the ditch company, from whom water has been obtained, have given notice that no more can be furnished as a motor.

The Charronnat quartz mine has for some time past been steadily improving in its lower levels, and recently ore was extracted which was estimated to be worth from $150 to $200 per ton.

The Nevada City quartz mine is steadily at work, and the erection of new buildings and more efficient machinery is in contemplation. It is producing very satisfactorily, and has encouraging prospects ahead.

The Murchie quartz mine has been shut down for some time past. The late superintendent says that there are hundreds of tons of low-grade ore in sight, but will not pay to work with steam power.

The Mountaineer quartz mine, on Deer Creek, is steadily at work, the ore improving as depth is attained. For some time past it has paid dividends.

The Wyoming quartz mine is at work, and has perhaps a better appearance than ever. Rich rock is being taken from the mine, but it is claimed, however, that some of this rich rock comes from the Champion, an adjoining quartz mine, the owners of which have had surveys made, and commenced suit against the Wyoming Company for the recovery of as much as $300,000.

The Champion referred to is steadily at work, and paying its way satisfactorily.

But little has been done on the Pittsburg quartz mine for some time past other than to excavate a drain-tunnel, about 1,000 feet in length, from Gold Flat. This drain-tunnel strikes the main incline shaft about the 200-foot level and will carry away, it is believed, all the surface waters, and allow the lower levels to be worked more economically and satisfactorily than at any former period.

There are quite a number of mines opened on a small scale in Willow Valley and other points in this district, but as yet can only be considered as prospects, showing no particular developments.

Washington mining district.—The Eagle Bird quartz mine has an incline shaft (about 40 degrees) down on a ledge 200 feet or to the third level. Drifts north and south aggregate 200 feet. The rock improves as depth is attained, shows free gold and galena sulphurets, and averaging $8 per ton. The ledge is from 4 to 10 feet. There are five concentrators in use—three Triumphs and two Frues. A new 20-stamp quartz-mill is nearly completed, in which 7 and 8 feet Pelton water-wheels will be used. Mining and milling costs about $3 per ton. About twenty men are employed.

The Yuba quartz mine is an old mine situated near the Eagle Bird. A winze has been sunk about 200 feet below the tunnel-level, and drifts north and south run about 300 feet in length. A cross-cut is likewise

driven from the tunnel-level some 200 feet or more. A good ledge shows at the face. The average value of the rock is $10 per ton. There is a 15-stamp quartz mill driven by water-power, with a 40-foot overshot-wheel, a Burleigh air-compresser, 12-inch cylinders, driven by Leveller turbine. The cost of milling and mining is $3 per ton. There are fifty men employed in and about the mine.

The owners of the Secret Treasure quartz mine (the old "Tecumseh") are erecting a new 10-stamp quartz mill to be driven by water-power, and sinking two shafts on the ledge, which are down about 10 or 12 feet at present. The rock averages $10 per ton, and the ledge from 2½ to 8 feet.

The Lindsay quartz mine is being worked by six men. A Huntington roller-mill, with a capacity of 15 tons in twenty-four hours, to be run with a 6-foot Pelton water-wheel, is being constructed.

There are several prospects being opened in this district, but as yet have not commenced fairly to work.

Columbia Hill district.—Several ledges are being prospected at Columbia Hill, and some encouraging reports have been received therefrom, notably concerning the Delhi quartz mine, but as yet no developments of a permanent character have been made, although the owners of the Delhi have great faith in its permanency and have been constructing a 10-stamp mill with improved machinery.

Drift mines—Lowell Hill district.—The East New York employs about sixty men working on the gravel channel, and has reached a length of 1,500 feet. The channel at this distance is about 400 feet wide and the gravel good. The yield is very satisfactory. The Planet's boundary line is within 200 feet of the New York workings, on which the company's new tunnel is in about 350 feet.

The Swamp Angel is working only on a limited scale, the East New York permitting the company to do so through their tunnel.

Bloomfield district.—The principal mine in this district is the property of the North Bloomfield Gravel Mining Company. In the official report of this company for the year ended January 31, 1884, the bullion product for the year is placed at $483,187.57, of which $180,000 was paid in dividends to stockholders.

The Derbeck is working a large force of men, and the yield is good. The long tunnel from Humbug Creek is completed to shaft No. 2, through which work is being prosecuted to great advantage. The mine paid during the year six dividends, amounting to $60,000.

The hydraulic mines of this county are all closed.

NAPA COUNTY.

Mr. R. B. Synington, of San Francisco, communicates the following:

Mining is limited to what are known as the Calistoga mines, situated near the base of Mount Saint Helena, and about 2½ miles northeast of the town of Calistoga, the terminus of the Napa Valley Railroad. The mines consist of a group of quartz veins running in a northeasterly and southwesterly direction, in sedimentary rock formation, and dipping to the northwest.

The principal veins are the Lima, Grigsby, Old Discovery, Ida Easly and Palisade, all from 3 to 8 feet wide, and containing silver sulphurets in paying quantities. The most work is at present being done on the Palisade and Ida Easly, where a tunnel has been run along the vein about 400 feet, yielding rock of an average value of $60 per ton. A

shaft has been sunk about 160 feet below the tunnel-level and rich ore has been taken, proving the continuance of the vein.

Messrs. Grigsby & Co., the owners, have aimed to open up the claims thoroughly before erecting reduction works, so that when built the works will have ample supply of ore for years to come. No effort has thus far been made to extract ore beyond that taken from the various drifts, &c.; of this 32½ tons were shipped to San Francisco during the past summer, which gave net returns of $2,443. There are other claims in this vicinity, but little has been done to develop them.

PLACER COUNTY.

The following review of the mines of this county is by R. L. Dunn, of Auburn:

Rocklin and Pino districts.—The little mining in these districts is entirely placer, and the method of working, except in one mine, is by drifting.

The Laird mine has been hydraulicked, and paid fairly well during the year. A hydraulic elevator is employed to raise the gravel to the sluices, and from three to six men are employed.

The Lee, situated three-fourths of a mile southwest of the Laird, has been successfully worked during the year. Four years ago a shaft was sunk 54 feet through the gravel, and a pay streak found. It was, however, impossible to work the mine through the shaft, and it has this last summer been successfully developed by an open cut and tunnel 650 feet long. The pay gravel is about 2 to 4 feet deep, 60 feet wide, and extremely rich. The first 260 car-loads taken out and washed yielded $10 a car-load.

Penryn mining district.—Of the two quartz mines in this district the Alabama has shut down and the Chicago has been run occasionally; no new work being done, but considerable low-grade ore was taken out of stopes already opened.

Ophir mining district.—Quartz mining has been inactive in this district, and no new discoveries made.

The Gold Blossom has been idle, owing to litigation. The mill has been employed a portion of the time on custom work.

The Belmont mill, the largest and finest equipped in the county, was destroyed by fire on the first of the year.

The Morning Star, Middle Star, and North Star quartz mines make but little showing this year.

On the Middle Star, a shaft has been sunk 160 feet. The ledge in this is very large and increases with depth to the bottom of the shaft, where it is about 8 feet wide. The rock from this shaft milled $9 per ton in free gold. The 300-foot level of the main shaft, has been extended. Towards the south, near the bottom of the shaft, the ledge forks, both branches being nearly the size of the mother vein. The pay chute extends into both of them, and 85 tons of rock taken out here yielded $2,100, or at the rate of $24.70 a ton. Prospecting, and the opening up of stopes, is all that has been done during the year, owing to its being bonded for sale.

The Crater Hill mine, after being operated for a few months in the early part of the year, was shut down, the pay stopes above the 800 foot level being worked out. The mine will not be re-opened under the present management on account of the heavy expense, and owing to the fact that the main pay chute has pitched into the adjoining mining

claim on the east—the Saint Patrick Consolidated. This latter has not been worked during the year.

The Belleview, Belvoir, Minarika, Spear, Back Action, Quinn, Almatah, Eckley, and Green were not worked during the year.

The Grass Ravine mine, owned by Cooper & Son, was worked for a few months with encouraging results. The main shaft is down on the ledge 100 feet, and in ore that mills $12 per ton.

Considerable work with a small force of men has been done on the Saint Lawrence mine. The ledge averages 27 inches in thickness, and an experimental crushing of 15 tons averaged $20 per ton.

The Friday mine, for several years closed, was leased by Messrs Handy & Ferguson early in the year, and has been reopened. After several months prospecting pay ore has been struck, but as yet its extent and value are undetermined. The Friday is in the slate formation, and the gold is found in pockets, whose position and extent is determined by the line of impregnation of the country rock with iron and other metallic oxides.

Auburn district.—Little mining has been carried on in this district and that principally in prospecting, which employs but few men. Duncan Hill has been practically deserted during the year. Assessment work has been done, and a few tons of rock have been taken out of the Conrad, Shurtleff, Jackson, Hunter, Booth, and Crandall.

On Baltimore ravine, about a mile southwest of Auburn, two claims are being developed.

The old Crœsus mine is being reopened by Messrs. Norton & Hooper who have, on a small experimental crushing, obtained $28 a ton from the ore.

Work on the Oro Fino is being pushed. The shaft is down 75 feet and several lots of ore taken out at different times in the last three years have paid from $10 to $20 per ton, but as yet the development is insufficient to decide on the permanence and extent of the pay-ore chute.

About a mile north of Auburn, two miners, Messrs. Holden & Smith have been working a thin seam of quartz which has been remarkably rich. Every piece of quartz taken out shows gold, and most of it is specimen rock. A pan of it pays from $20 to $100. Several thousand dollars have already been obtained, without any indications of exhaustion. But it is a pocket mine, and the pay ore is likely to be worked out before any depth is attained.

Gold Run district.—The great hydraulic mines at this point have not been operated during the year, and little drifting has been done. The small portion of the deep channel running through the claims has heretofore been found very rich, and would have paid well worked by drifting.

The town of Gold Run, a few years ago one of the most flourishing mining camps in the county, is now nearly abandoned, owing to the cessation of hydraulic mining.

Dutch Flat district.—The condition of the mining industry here is almost similar to that at Gold Run. While its hydraulic mines were not enjoined, they were liable to be at any time, consequently mining was prosecuted under great disadvantages, and the yield reduced from that of the year 1883.

In the old Somerset mine, adjoining and southwest of the town of Dutch Flat, a shaft is being sunk to the bed-rock to prospect for drift diggings. It will be 120 feet deep, and it is believed will locate the

bottom of the channel on the Dutch Flat side of the ridge, that has been opened on the south side at Gold Run. The top gravel in this mine, worked by hydraulicking, proved very rich.

Alta district.—The auriferous gravels in this district are a continuation of the Dutch Flat and Gold Run banks, but being lava-buried they have not been touched by hydraulicking, and it is only comparatively recent that drifting has been tried. The most important mine at present worked is the Alta, which lies under, and adjoining on the north and east, the town of Alta. Work was commenced on this mine in September, 1883. A shaft 190 feet deep was sunk to bed-rock and a main drift run 1,100 feet northerly. The ground thus far opened prospects exceedingly well in coarse channel gold, paying about $8 to the man. The area opened thus far, all on the rim, is about 1,100 by 800 feet, all of which is pay ground. The mine will be thoroughly prospected and opened before drifting on an extensive scale is commenced.

The Shady Glen placer mine is south of and adjoining the Alta, and covers 170 acres. The gravel has been thoroughly prospected by 10 prospect shafts, which have also located the position of the channel. A working tunnel has been run in the bed-rock 1,200 feet, and will have to go 500 feet further to reach the channel. The gravel prospects very well; and the mine, once opened, will be a large gold producer.

There is a large area of unworked deep gravels running from Alta past Shady Run, and toward Blue Cañon. This section of the county having large and profitable hydraulic mines, but little attention was paid to possible drift diggings. Now, however, that hydraulic mining is stopped, these deep drift gravels are being prospected.

Blue Cañon.—The Lost Camp hydraulic mine, the only claim opened at this place, was worked during the water season and paid well.

Iowa Hill district.—The Orion Company having washed all their available ground on the Indian Cañon front, worked on the opposite side of the ridge this year, and hydraulicked a large area of shallow ground. This paid very largely and made the working of the mine quite profitable.

The Golden Gate mine was hydraulicked and as in 1883, was one of the largest producing mines in the district. Very coarse gold is found in this mine, pieces from 1 to 6 ounces not being uncommon. A tunnel is being run to work the mine by drifting.

The Strawberry Flat drift mine continues to pay well, the rich gravel channel struck in 1883, showing no indication of becoming exhausted. This mine employs 8 men.

The Morning Star drift mine has produced very little gold this year. Only prospecting work has been done, employing on an average 4 men.

The Mohawk drift mine, worked by Willis Gould, is a small mine, but pays very well. It is opened by a tunnel 1,100 feet long.

The Joe Burns mine worked on a small scale, paid well.

The bed-rock ground in the Independence Hill mine was washed and the bed-rock cleaned during the year, making large returns. But little ground in this claim yet remains to be worked, and that is not at present available, so the mine will not be worked in 1885.

The Homeward Bound hydraulic mine was worked during the year, but not very profitably, the gravel being too hard to wash readily.

The Arkansas drift mine, at Grizzly Flat, has been taking out pay gravel for several months. The mine is worked through a tunnel, and 6 men are employed.

The Enterprise, Anglo-American, Attalus, Pritchard, Union, Aurora, Phillipps, and Wolverine mines were not worked.

The Sucker Flat drift mine still continues the leading mine in the district. If anything, there is more rich ground opened now than at any previous time in the history of the mine. The mine has paid largely during the entire year, although only a few hands were employed. The small force employed was due to the fact that negotiations were pending for the sale of the mine to a French company. It is claimed that their experts having reported favorably, the mine will soon change hands. An 80-stamp mill is in contemplation to crush all the gravel coming out of the mine, so as to prevent loss of the fine gold. A body of gravel paying $20 a day to the man has just been struck. From the amount of pay gravel already in sight, it is believed that the mine will be a profitable gold-producer for many years. The advanced workings are now in 2,500 feet from the entrance.

Adjoining the Sucker Flat on the east, is the Copperbottom Drift mine. This had lain idle for many years, but the rich gravel found in the Sucker Flat and the probability that the same pay channel entered the Copperbottom, have led to the reopening of the latter. The mine is worked through an incline. Cleaning out and prospecting work only has been done, no pay gravel as yet being found. Ten men are employed.

The Giant Gap claim, after thorough prospecting, has been abandoned as valueless. The 2,000 feet of tunnel on the claim cutting through the ridge between Green Valley and the North Fork of Shirt-tail Cañon has, however, demonstrated that the Sucker Flat channel does not go on up the divide toward Damascus, but is cut off by Green Valley.

At Wisconsin Hill the Lebanon and Columbia mines are being worked by Chinese. Aside from this there is but little mining going on at this point.

None of the quartz mines in Humbug Cañon have been worked during the year, though it is the intention of the owners of the Pioneer to put a mill on their mine in the summer of 1885, the prospecting already done having developed a body of ore sufficient to justify making preparations for permanent working.

The total product for the year in this district, including about $90,000 produced by Chinese, is about $225,000.

Butcher Ranch.—The so-called seam diggings at this point are the only mines worked. These, operated in a small way by hydraulicking, paid fairly. No new developments have been made. The two important mines are the Whiteman and the McKinstry & Gilbert.

In the Mammoth Bar mine the surface has been washed off and a pit for the elevator excavated down to bed-rock. Some gold has been found, but not enough to pay.

Todd's Valley district.—Pond & Co.'s large mine was worked during the year, but did not pay as well as in 1883. Profitable mining on any extended scale is about over in this district.

Forest Hill district.—The Dardanelles mine was worked by hydraulicking during the winter and paid very largely. As soon as the water gave out work was commenced on a drifting tunnel from the face of the hydraulicked bank. This tunnel, it is estimated, will have to be 700 feet long in order to reach the pay gravel. Meanwhile the mine has been drifted through an old tunnel, and paid well. The result of working this mine for 1884 has been highly satisfactory. From 15 to 25 men have been steadily employed.

The Big Spring, adjoining the Dardanelles, reports no new develop-

ments for 1884. It is worked by drifting, employs 6 men, and paid about as in 1883.

In the San Francisco mine the bed-rock tunnel is being continued. No pay has been taken out of this mine as yet.

The Baltimore employs from 3 to 10 men. At present only prospecting work is being done.

In the Mayflower the work done during the year has determined the location of the channel. The shaft, 200 feet deep from the hydraulic workings to the bed-rock, is on the west rim. From it a drift has been run easterly, at first following the pitch of the rim, but finally leaving it and running through gravel and lava till the east rim was reached. A shaft is now being sunk from the drift to prospect the bottom of the channel. All the gravel thus far encountered will prospect fairly. A typographical error in the report for 1883 made it appear that the gravel in this mine, as then opened, would pay $125 per car-load, when it should have been $2.50. From 20 to 40 men have been steadily employed. The total cost of opening this mine to date is nearly $225,000.

At the Washington mine the shaft was completed to the bed-rock. From the bottom of the shaft drifts have been run in several directions in search of pay gravel, but thus far unsuccessfully, though a little gold has been found. The south drift, running toward Forest Hill, is the best prospect of these. Should any pay gravel be found, it will belong to a different horizon from any known yet.

The Cranage and Adams hydraulic claims, at Smith's Point, have been worked and paid about as usual. From 4 to 6 men are employed in each of the mines.

The Arthur mine is not being operated at present.

Bath district.—The Breece and Wheeler mine has shown its usual alternations of rich pay and barren ground, but has averaged well and been a profitably worked mine. The main tunnel, on the lower of the two known pay leads, is in 4,000 feet. From 6 to 20 men have been employed.

The Orono has been yielding gold steadily through the year. No new developments are reported.

The Grinnell mine has been worked to a small extent, 2 men being employed.

At the Baker Divide the works on the Volcano Cañon front have been permanently abandoned, the narrow channel here being worked out as far as practicable. The mine was only a small gold-producer this year. The necessary surveys have been made, and it is the intention of the owners this coming summer to run a tunnel from the Shirttail Cañon front into the center of the divide. This tunnel it is estimated will have to be 3,600 feet long, and will take two years to make, at a cost of about $40,000. When completed it will open for working and exploration a very large area of as yet untouched ground. The channel in this mine is believed to be the same as in the Turkey Hill and Mayflower mines.

Michigan Bluff district.—The Big Gun hydraulic mine was the only important claim operated here. The gravel, though still paying, is hardly as rich as in former years, being on the rims of the channel. The best ground in this mine has been worked out.

The Bowen mine was worked by 2 men steadily, most of the time hydraulicking to get a face from which to run a new drifting tunnel, the present one being too high to work much ground. The gravel in this claim is very rich and 10 men could be employed steadily drifting.

The Turkey Hill or Weske mine, the largest drift mine and for years

the most profitably worked in this district, has been closed down the entire year. This mine was worked under great difficulties and at enormous expense. Failing to pay for a few months, it became involved in financial difficulties, which led to its being closed down. The workings, far below the level of the main tunnel, have filled with water. This and litigation will probably prevent the reopening of the mine for several years. The closing of this mine threw 70 men out of employment.

Almost the entire mining population of Michigan Bluff has this year been engaged in working river and bar claims—shallow places in the bottoms of the main river cañons. These have paid good wages to the men employed, and about $40,000 in the aggregate has been taken out.

Sunny South district.—The Hidden Treasure still continues to pay as in 1883. No new developments have been made, and, on the other hand, the gravel in sight is not becoming exhausted nor paying less than formerly. This mine is still the leading gold-producer in the county.

Deadwood district.—The Golden Fleece is shut down. This claim has been prospected for several years past at heavy expense, without making any returns. It is reported that the last workings developed a body of rich pay gravel.

Several small claims right at Deadwood have been worked during the year and yield a little gold; small wages for the few men employed. Nothing of consequence has been struck here for several years.

Last Chance district.—Several drift and hydraulic mines are worked here, and pay, though not largely. The front channel, in which was found the best pay, is practically worked out, and the back channel does not seem to carry gravel that will pay over $3 or $4 to the man. There is, however, a large area of untouched ground in this district, which will eventually attract the attention of the drift miner. A portion of it lies on the Last Chance Ridge, running up through Startown, and another large area is the Duncan Divide, for six miles up to Bald Mountain.

At this last-named place the Bald Mountain claim is being opened, and as far as prospected proves very rich. It has produced some gold this year. Ten men are employed.

At Big Meadows, in the headwaters of the Middle Fork of the American River, John Yoder is opening a valuable quartz ledge. A tunnel has been run in on it, which will give several hundred feet of stopes for the entire length of the claim. The ledge is from 2 to 5 feet thick, and the ore assays average $25 per ton in free gold alone.

At Canada Hill a small quartz ledge was worked during the summer, the rock milling $30 a ton.

River mining.—Considerable river-bed mining was done by Chinese. The North Fork of the American River, between the mouth of Cañon Creek and Rice's Bridge, was mined by three companies, and on the Middle Fork, from Poverty Bar up to the junction of El Dorado Cañon, about ten companies have been working.

The total Chinese production in the county is about $175,000.

The results of the mining industry for 1884 are not up to the indications of the beginning of the year. Quartz mining, then being actively prosecuted and paying well, has been at a standstill. From a yield of $200,000 in 1883, the production in 1884 has fallen off to about $50,000. The mines of Forest Hill, Bath, and Michigan Bluff have also fallen off considerably in yield. The rest of the county shows a slight increase of production over 1883. The causes lessening the production

of 1884 are, with the exception of the closing down of the hydraulic mines by injunction of the courts, only temporary in effect.

Of the *Damascus mining district* Mr. J. B. Hobson, Iowa Hill, says:

"This district is situated on the ridge known as the Iowa Hill Divide, between the North Fork of the American River on the north and El Dorado and Secret Cañons on the south, and includes townships No. 15 north, range Nos. 11 and 12 east, Mount Diablo meridian. Damascus and Sunny South are the principal towns in the district, the former located on the north and the latter on the south side of the ridge, about 25 miles from Colfax, with which it is connected by a good wagon road, via Iowa Hill. Several productive deep gravel mines are worked by drifting, and a large number are in course of development by tunnels and shafts. There are also several promising quartz mines, the Pioneer and Poole being the most extensively developed.

The elevation of the ridge above sea level on the west boundary of the district is 4,600 feet, and 5,400 feet on the east, at the head of Secret Cañon. The bed of the American River forms a deep cañon, and is 2,500 feet above sea-level at the mouth of Humbug Cañon. The formation of the top of the main ridge is a deposit of lava and cemented volcanic sediment and *débris*, varying from 100 to 1,000 feet in thickness. The surface is covered with a heavy growth of sugar-pine, yellow-pine, spruce, fir, cedar, and black-oak timber. Underlying this volcanic deposit are found the gold-bearing gravel beds of the extinct river channels, two systems of which are being developed and worked successfully and profitably. One of these channels, composed almost entirely of white quartz gravel, is about 1,000 feet wide, runs nearly south, with a grade of about 60 feet to the mile, is known as the white channel, and has been worked continuously since 1854 by the Mountain Gate Company, and since 1875 by the Hidden Treasure Company. A strip 200 feet wide, worked from the center of the channel, yields gold at the rate $1,000,000 per mile of channel, the working depth of pay gravel being 6 feet next the bottom or underlying slate rock.

The main ridge channel of pay gravel is composed of dark-colored material, the gravel and boulders being hard slate, trap quartzite, and volcanic rocks, the absence of the white quartz being noticeable. The pay gravel has a bluish color and the channel is known as the blue channel. It was probably deposited at an earlier period than the white channel, as its bed has eroded the underlying rock 80 feet deeper than the white channel. It has a southwesterly course and a grade of about 100 feet per mile. This channel is being worked 500 feet in the Mountain Gate mine, and the south branch in the Whisky Hill mine is worked 60 feet wide. All the companies located on the channel east of the Mountain Gate mine who were fortunate enough to have their tunnels sufficiently low have struck pay gravel similar to that found in the Mountain Gate, Bob Lewis, and Dam mines.

The Mountain Gate Mining Company owns 1,004 acres of mining ground, covering both the white and blue gravel channels. There are about 20,000 feet of tunnels and drifts in the mine. The main working tunnel is now in over 7,000 feet. There are also two water-power hoisting works placed on the line of the main working tunnel. These works are driven by water that drains from the workings in the upper or white channel, and are used in hoisting pay gravel from the blue gravel channel. During the past two years the main tunnel was driven ahead 900 feet, and new hoisting works erected, the object being to push the main working tunnel to the southern boundary of the mine, and then work the pay gravel out towards the point.

Owing to the amount of development work done during the past tv years, only sufficient gold was extracted to satisfy the immediate wan of the owners.

The Hidden Treasure Mining Company owns about 600 acres mineral land, located to the south of the Mountain Gate mine. T claim covers about 9,000 feet of the white channel, and the blue cha nel runs through a portion of the mine. The white channel has be worked steadily since 1875, yielding a large amount of gold, about per cent. of which was profit. The gravel yields from 75 cents to per car-load.

There remains about 5,000 feet in length of unworked ground in t mine. About 70 miners are steadily employed.

The Bob Lewis mine covers about 500 acres on the blue gravel cha nel. This mine has been worked steadily since 1860 on the nor branch of the blue channel, and has produced from $8,000 to $10,0 of gold per year. The pay gravel in this mine is rich, and yields fr $6 to $10 per car-load.

The Dam Company owns about 320 acres, covering a branch of t blue channel. This mine has been worked steadily for twenty yea by six shareholders. The gravel yields about $4 per car-load.

The Derby Placer Mining Company owns about 120 acres of miner land. A tunnel is being driven in this mine, the owners expecting find a portion of the white channel passing through their mine.

F. D. Adams & Co. own 480 acres of mineral land, supposed to cov the course of the main blue channel. The company is engaged in sin ing a shaft, which will be 800 feet in depth, to reach the bottom of th channel.

The Fork's House Consolidated placer mine lies east of the Bo Lewis and covers a portion of the main blue channel. The owner are sinking a shaft to determine the exact location of the pay grave

Cape Horn placer mine contains 640 acres, covering at least 1 mil of the main blue channel. The owner, J. C. Scott, of Forest Hill, has e pended a large amount of money driving a tunnel 1,500 feet, which wa found too high to reach pay gravel, and is at present engaged in dri ing a lower one, which it is expected will reach the channel.

The Alameda Consolidated placer mine contains 2,300 acres of mi eral land, covering the blue gravel channel. This property is owne by the Mitchler estate, and they are now driving a bed-rock tunnel strike the pay gravel.

The Bear Hunter mine lies south of the Alameda Consolidated, an covers a well-known branch of the blue channel. This mine is own by Messrs. Haney & Chappellet, who have driven a tunnel 600 fe which is too high to strike pay gravel, and are now engaged in drivi a lower tunnel.

The Indian Springs placer mine lies north of the Alameda Consolidate and is owned by Chappellet & Co., who have sunk several prospect sha on what is supposed to be a branch of the blue channel, and found ve encouraging prospects in gold. A tunnel is to be started to devel the mine.

The Golden Fleece Mining Company owns 640 acres, located east the Alameda Consolidated, and covers 1 mile of the main blue chann The company drove a tunnel 3,000 feet in length, at a cost of $40,000, a were rewarded for their courage and perseverance by finding an i mense deposit of blue gravel similar in all respects to that found in t Mountain Gate, Whisky Hill, and New Basil mines. The gravel yie

about $4 per car-load. The company is now engaged in equipping the mine for active work and the extraction of pay gravel on a large scale.

The Georgetown Consolidated placer mine is located east of the Golden Fleece, covers about 700 acres of land, and is 7,000 feet in length on the blue channel. The company drove a bed-rock tunnel 900 feet and struck pay gravel yielding $3 per car-load, and are now making preparations to more fully work the mine.

The New Basil Consolidated mine contains 1,000 acres and covers 10,000 feet of what is known as the Whisky Hill channel, which is a south branch of the main blue gravel channel. The company erected a steam-power hoisting works and sunk a shaft to bed-rock, and found pay gravel similar to that in the Whisky Hill mine. They are now driving drifts and gangways from the bottom of the shaft to develop the mine and put it in shape for work. The gold from this mine is similar in character and fineness to that found in the Whisky Hill mine.

The Union placer mine is a claim of 80 acres, owned by the Mitchler estate. A bed-rock tunnel is being driven to reach pay gravel.

The Spartan placer mine contains 320 acres, the north portion of which covers the blue gravel channel. The owners are driving a tunnel.

The Whisky Hill placer mine contains about 100 acres and covers a portion of the Whisky Hill channel. The mine is owned by a number of Greeks and is known as the Greek mine. The mine is worked by a tunnel, the gravel being very rich, yielding as high as 1 ounce per car-load. Six hundred feet of the channel have been worked from 10 to 60 feet wide and produced about $22,000 in coarse gold.

The Macedon mine contains 160 acres and covers about 2,000 feet of Whisky Hill channel. The owners are driving a bed rock tunnel to reach the channel.

Quartz mines.—The Damascus gold-bearing quartz belt is about 10 miles wide and underlies township 15 north, range 11 east, in this district, and running north and south through the State from Amador on the south to Sierra Buttes, in Sierra County, on the north. The quartz veins are numerous, particularly so on the point lying between Humbug Cañon and the North Fork of the American River, where the outcrop of many veins can be seen, varying from 1 to 30 feet in width. These outcrops can be traced down the steep sides of the American River, and, crossing it, are plainly seen running regularly up the opposite hill-sides. Several of these veins were discovered as early as 1862, and the rich portion worked in hand-mortars and arrastras. Only three stamp-mills were ever erected in the district, and two of these were abandoned during the Washoe excitement. The preference has been for placer mining. Since 1880, however, several companies have given attention to the development of many of these veins, which are now being prospected, the owners in nearly every instance finding ore-chutes of good milling rock.

The Pioneer quartz mine is the most important. The location is 6,000 feet long by 600 wide, with a vein 4 feet in width, carrying about 3 per cent. of iron pyrites and galena. There are three ore-chutes. One of these, near the south end of the location, has been opened to a depth of 80 feet by a tunnel cross-cutting the vein. This ore-chute was worked 600 feet in length and yielded $15 per ton, exclusive of the sulphurets. The second ore-chute was also worked at the same depth and length and paid $15 per ton. Eighteen thousand tons of ore were taken from the mine and crushed from 1854 to 1860, when the mill was destroyed by a land-slide. Since 1880 a tunnel has been driven to cut the vein 340 feet below the croppings. On the north ore-chute the tunnel cut a vein

of ore 11 feet wide, assaying from $6 to $3,000 per ton. A third chu of ore was found last October on the summit of the claim, between tl north and south ore-chutes, giving assays from $7 to $40 per ton. Tl sulphurets yield $200 per ton. A new mill is to be erected on this mi the coming spring.

The Poole mine is covered by a 1,500-foot location and crosses t American River to the west of the Pioneer vein. The mine is work through a tunnel on the vein, which varies from 8 inches to 4 feet thickness and yields $18 per ton and 31 per cent. of sulphurets, assa ing $400 per ton. The company owns a 5-stamp water-power mi There is a tramway from the mine to the mill. The ore-chutes abo the tunnel are worked out and a new tunnel is being driven to open t ore 100 feet lower.

The Lynn and Keller mine is a consolidation of four 1,500-foot clain lies west of the Pioneer, and has a cross-cut tunnel driven in which cu two veins, one 40 feet and the other 70 feet below the croppings. T east vein is 3 feet wide and the ore will average $18 per ton. Tl west vein is 9 feet wide and will mill $7 per ton. Another tunnel being driven to cut these veins 150 feet below the croppings.

The Bernard quaftz mine is 3,000 feet in length, with a vein 30 fe wide, composed of quartz and talcose slate. The vein matter is ve soft and the gold coarse. The mine is worked by ground sluicing a the gold saved in ordinary placer sluices. The vein matter pays abo $3 per ton.

The Dorer and Poole quartz mine is located on the north side of t American River, and is covered by three locations, being 3,500 feet length by 600 in width. The vein is strong and well defined, is 3 fe wide, and is being worked by a tunnel driven on the vein 1,000 fe above the river. The ore taken from the mine was worked in Pool Mill and yielded $28 per ton.

The Central and Extension is covered by two locations and has a stro 3-foot ledge. Gold was found in the croppings, and a tunnel is bei driven on the vein to ascertain its value and depth.

The Boys and Dutch Flat are two locations on a large vein 12 feet i width. Prospect tunnels driven on the vein exposed a large body low-grade ore, assaying $6 per ton.

PLUMAS COUNTY.

The result of the year's work in the mining enterprises of this count has been very encouraging, and while no great excitement has bee caused, the developments have been of a very promising character.

Mr. W. J. Lamb, of Crescent Mills, furnishes the following review the mines of this county:

Greenville district.—The closing of Cherokee, Gold Strife, Souther Eureka, and Indian Valley during 1882 and 1883 was a serious blow t the district, but the opening of the Blake chute in the Green Mountain which develops the ledge to nearly 1,200 feet in depth, and of severa other prospects, has to some extent counteracted it. More developmen has been made and better results obtained from work done than for sev eral years. The yield of bullion has not been large, but the return have shown a fair profit in nearly every instance.

The veins are small, with the exception of Green Mountain and In dian Valley, but the belt that extends from Green Mountain on the ea to the North Fork of the Feather on the west is prolific in small veins

good pay ore. This section has every natural facility for successfully working low-grade ores, and an unlimited amount of timber.

It is well watered and the wages are low. The ores are free milling, carrying a very small percentage of sulphurets. The gold, though generally fine, is free from rust and easily amalgamated by the plate process. The quartz is of small fracture and the averaging crushing per stamp of 850 pounds is over 1½ tons per day of twenty-four hours.

The supply of water has been abundant and the heavy rains during the latter part of December have insured a sufficient quantity for 1885, should no more storms occur. The Round Valley reservoir, which supplies power to all the mills in the eastern section of the district, contains more water that at any time since the dam was built. The raising of the dam in 1882 and 1883 increased its capacity far beyond the requirements of the mines at present in operation.

The Arcadian Mill Company owns a 10-stamp water-mill situated in North Cañon, about a mile below the Round Valley. The same parties own it that control the Sunset group of mines. It has run about six months during the year, a majority of the time on Sunset ores, but it has been leased for short test runs by the Ano and Forest King.

In the Ano quartz mine (formerly known as the Flora Glazier) a tunnel started during the year about 200 feet from the end of the old tunnel, cut the ledge at 110 feet. They already have 100 feet of backs, and should the chute continue east, as indications point, the amount of reserves will be largely increased. From this chute 300 tons have been worked in the Arcadian mill, returning about $4 per ton on the average. The conveniences for handling the ore are first class and the rock is easily broken, requiring but very little powder. The vein is being worked 8 feet in width. The owners have contracted for hauling 1,000 tons of ore as soon as the roads are in suitable condition, and probably the mine will be a profitable producer the coming year.

Nothing but assessment work has been done on the Antelope. It is owned by the same party as the Central, but has not received the same attention. There are indications that it might be a profitable mine.

A little work has been done on the lower tunnel of the Batchelder and Wing, but no amount of pay ore has been struck.

The Crescent Milling and Mining Company, which has yielded largely in years past, has been idle most of the time since the latter part of 1882, at which time it yielded $40,000. No profit has since been made, owing to bad management, expense of repairing mill and fitting up for water-power, and some changes at hoisting works. The ore is rich and free milling and will pay well with even fair management. The property has been in litigation for some time, but is now free. The owners are men of large means and of considerable experience, and it is probable that developments will begin the coming year on a practical and systematic basis.

The Central quartz mine is owned by T. F. Emmons, who has advanced the tunnel 150 feet during the year, developing a chute of pay ore 75 feet in length, averaging 3½ feet in width, with 175 feet of backs. The ore is soft and can be removed by pick and hammer. Six hundred tons worked in the New York mill produced at the rate of $6.50 per ton. The outlook for this property is very good and a sale is talked of.

The Champion adjoins the old Bullion, which formerly paid well, averaging about $10 per ton. It is supposed to be the same vein. The owner has sunk an inclined shaft 40 feet on the ledge, which is 3½ feet in width and shows fine prospects, and will probably pay to mill the full width.

The four mines formerly the property of the Cherokee Gold Mining Company have been relocated and are now owned by Valentine & Standert. The drift from the main tunnel on the Valentine (old "Kettle") has been extended 250 feet, a little gold being found in the last 30 feet run, though not enough to pay to work. Nothing has been done on other claims yet.

The property of the Gold Stripe Mining Company has been idle since 1882 until the past summer, when the Standard claim was worked awhile. The main level was advanced about 250 feet, where a little pay rock was found. From this 170 tons were milled, returning $1,000. Nothing is now being done, and there is no probability that anything will be done during the coming year.

The Green Mountain Gold Mining Company extended, during 1884, the Bidwell or No. 6 tunnel 780 feet west, making the length on the vein 1,987 feet and a total length of 3,363 feet. The Blake chute was reached February 11, and a double compartment raise put up 440 feet, connecting with No. 5 tunnel, giving thorough ventilation and facilitating the handling of ore from above No. 5.

From No. 1 raise three blind drifts have been run to open up this chimney, and a second raise put through to facilitate the removal of the ore. The Bidwell tunnel is steadily being pushed, power drills being employed. The face of the tunnel is now distant from the sulphuret chute above 75 feet. The 60-stamp mill, started May 19, has run continuously through the year, making good returns.

The Gem quartz mine (formerly known as the Premium No. 2), was relocated late in the year by Mr. Halleck, who is now stripping the ledge at the surface. About 60 feet have been uncovered, and the ledge shows pay ore for nearly the whole length, varying from 1 to 4 feet in width and in value from $5 to $100 per ton. There is an incline shaft on the ledge, which was started at the east end of the pay chute; but as the chute dips to the west, it does not determine the value or extent of the chute in depth. Bunches of decomposed quartz have been found, from which $150 per ton has been taken out by hand-mortar in a couple of hours.

Ore is now being hauled to the Premier mill, and a short run will be made on what ore is broken, preparatory to starting operations in a systematic manner. The outlook is very good for a good-paying small ledge.

Little has been done on the Garfield during the year, about 20 feet of tunnel and cross-cuts being the only development work. The ore is low grade and would probably not pay were it not for occasional streaks and bunches that are rich. The owner has such confidence in the property that he has constructed a fine dump house at the mouth of the tunnel, and expects to make a milling test during the coming year.

The Forest King was discovered in May, near the Round Valley reservoir. It is probably of the same ledge as the Ellis mine, which yielded large profits in early days. The ledge has been stripped in places covering a distance of 500 feet, and shows a vein of quartz from 3 to 8 feet in width, carrying gold of good pay. No. 1 tunnel gave them 50 feet of backs.

The Indian Valley has been idle during the year, owing to litigation, which, however, is now at an end. This mine enjoys the reputation of being one of the best mines in the district, though its history shows that it has failed to pay under any management for many years. The rock yields about $5.15 per ton, but the quartz is very hard, requiring drilling and blasting the entire width, and, with the expense of pumping and

hoisting, there is little or no profit. The western portion of the mine, in which is located the richest pay, has been worked out down to within about 50 feet of the bottom of the shaft. There is a bunch of very good ore in a short winze sunk below the drift from the bottom of the shaft, but the chute at this depth is broken up, and what pay there is occurs in small and nearly horizontal floors between floors of bluish barren quartz, very hard, and the expense of working is consequently great. The eastern chute, called the Magna Charta, is about 1,200 feet east of the main shaft; it is a large body of low-grade ore that will probably mill between $3 and $3.50 per ton. It is worked out down to the Blood level, which is 186 feet above the present working level, the Union. At present there are no indications of the mine starting operations.

The Monitor mine has been turned over to the Bank of California, to whom it was mortgaged as security. Nothing has been done on it during the year, though a watchman is kept at the mine.

The Miller is located to the north, adjoining the Green Mountain property, and is owned by G. W. Miller. It was formerly known as the Pulsifer. Some very rich pockets were found on it several years ago. The vein is very narrow, from 1 to 6 inches. It was worked under a lease during the summer, and two runs, in less than three months, took out over $1,400.

Considerable development has been made during the past two years on the McLellan. No. 2 and No. 3 tunnels have been pushed ahead, No. 2 having about 75 feet yet to be run to reach the ledge. No. 3 develops the ledge for about 450 feet, and, though prospects have been attained, no considerable amount of pay ore has been developed.

The New York has been idle since the death of Mr. May, one of the owners. Up to the time of closing down the mine it paid well, 8 men being employed in mine and mill, and producing from $2,200 to $3,300 per month. The May estate being now settled, the property will doubtless be worked.

The Premium Gold Mining Company has advanced No. 2 tunnel 110 feet, the rock being very hard. An upraise was made 92 feet, but no favorable developments have been made; 275 tons of ore were milled, returning about $5 per ton, but the vein being narrow and walls hard little or no profit was made. The ledge varies from 1 to 3 feet in width, and pay ore occurs in pockets which are sometimes very rich. There are at present no prospects of starting up.

Fermatim & McGrath have milled about 100 tons of rock from the Pet during the fall, but no profit was made, the hauling, rent of mill, and extra expense being large. They are now running a lower tunnel, which is over 400 feet in length.

Little work has been done on the Rodgers till the present year, when the finding of rich specimens near the surface encouraged the owners to develop the claim by running a tunnel, which at 150 feet cuts the vein at a depth of about 80 feet. From here a drift has been run along the hanging wall for 170 feet. The ledge shows gold nearly 12 feet wide in placers and occasional small rich pockets, but no milling has been done and no quantity of pay ore is in sight. Considerable pay ore was taken out by hand-mortar from selected rock. The ledge is 25 feet wide.

The Round Valley claim, which has been in litigation for some time, is now the property of J. S. Drury, who has extended the upper tunnel 350 feet. It is in a chimney of low-grade ore, which it is believed will pay a small profit; the ledge here is well defined. The lower tunnel develops the ledge at a depth of 250 feet; it is now in 600 feet and has

200 feet to run to reach the Wiles chimney; this chimney, when worl above, milled $30 per ton. The outlook for a good mine is very flat ing.

The Southern Eureka, after passing through many hands, has fin been secured by a local syndicate, which has set about to open work it in a practical manner. The No. 3 tunnel has been extended feet during the year, and is now within about 200 feet of the east lin main chimney, work steadily progressing. The work of the last months has shown low-grade ore, carrying probably from $1 to $2 per which, as it was already broken, has been milled and has nearly paid penses of tunnel. The mill is now idle, awaiting the completion of tu to pay ore.

The Sunset Gold Mining Company owns the Arcadia, Hong-K Sunset No. 1 and No. 2, and Wilson, on which considerable deve ment work has been done with good results. The Sunset No. 1 or tunnel has been extended 200 feet and two short chimneys found, wl have been worked sufficiently to pay cost of development of the p erty. This tunnel is being run to open the Arcadia and Wilson cla which cross the upper end of Sunset diagonally at about 450 feet f present face of tunnel, both of which have good chutes of ore that h been worked out down to their lowest level, the ore averaging resp ively about $6 and $8 per ton.

The Sunset No. 2 tunnel has been run 400 feet to the ledge, a drift from intersection 180 feet east on the ledge, which shows pay the full length, varying in width from 2½ to 5 feet and in value fro to $7. This body is in reserve and will not be milled until Sunset N and the Arcadia and Wilson are worked out, when the tunnel wil run ahead to develop these claims at greater depth, and the 10-st mill moved down to this level.

The main tunnel in the Taylor Plumas has been advanced 200 f but no amount of pay ore has been found. The seam is very small the walls very hard.

The claim of Windlich & Schaer, located near the head of Rush Cr has been worked continuously since spring by washing, and, though paying largely, a small profit has been made.

Roedde & Lawson, in Bullfrog Ravine, are working the old Geiss cl having washed all through the water season. They have also dri 300 feet into the hill to open a channel, but have not yet reached channel. The claim has paid a small profit.

Ellis & Bressler have been piping during five months of the yea the Providence Hill claim with a fair head of water, and have t out about $2,500 with 3 or 4 men. Drifting will soon be done, good judges say ground will pay them $10 to the man. The tit property is now in dispute, so inside facts cannot be ascertained. S 3 or 4 Chinamen are washing along the creek, and thei r staying is only evidence of pay.

Genesee district.—The Genesee Gold Mining Company purchased Dr. Quim property, which has a 10-stamp water-mill on it, and wh has been a regular though not large producer. The present own have been prospecting the mine and running the mill on selected from ground developed by former owners. The mill ran from Ma November, 6 men being employed on the plant; paid well. At p ent they are running the lower tunnel ahead to explore the vein, o 2 men being employed.

On the Tutt 220 feet of tunnel have been run to open the ledge. a point about 20 feet ahead of present face of tunnel the surface sh

fairly, the croppings paying $15 per ton by arrastra process, the tunnel being driven by 2 men.

Robinson & Co. have a 5-stamp mill on their property, but have done nothing during the year. The ledge prospects well, but they have been unable to save the gold on the plates.

The Cascade Ditch and Mining Company has been working 10 men during the summer on their property in Grizzly Creek, building and repairing flumes and putting things generally in shape for washing as soon as the season opens.

The Specimen, in *Granite Basin*, is looking well, having 300 feet of tunnel on the ledge, which shows a continuous pay streak, running from $8 to $30 per ton.

The Church has not been extensively developed. At 200 feet in depth a ledge 3 feet in width of high-grade ore was found—a test run, which yielded $18 per ton. Win Wagner is opening a ledge east of the basin, which has evidence of being a good property.

Graves & Co. are developing a ledge near the basin that is now showing fine prospects.

Last year's operations on the Seibert gave good returns.

Mr. Leland has put his hydraulic mine at the Dean place in shape to work at an outlay of $10,000. It has a large area of ground, with every indication of good pay.

Quincy Rood.—The Michigan Hill hydraulic has been washed all through the season, though not paying expenses, water being insufficient. During the fall they have put in higher up a new and longer reservoir, and will soon be in shape to handle more dirt at less expense.

The Shoo Fly gravel mine was washed from the early part of the year to the latter part of August, and, with limited facilities for hauling dirt, have still made fair wages, ground paying $3 per day per man during the season.

Mohawk district.—Hopgood & Black are erecting a new mill on their property. It is one of the Huntington improved and is expected to do as much work as a 6-stamp mill. It will be driven by a large overshot wheel and there is sufficient water for continuous operation. They have three properties, that are at present showing well—the Bullion, with a 3½-foot ledge; the Hawkeye, a wide ledge which carries gold the entire width, though not of high grade; and the May Flower, which is a promising claim. It is expected they will be running a mill early in the coming year.

The Valentine Mining Company are working 2 shifts of men in a tunnel in already 215 feet and within 125 feet of the ledge. It is expected that the tunnel will tap the ledge at about 120 feet in depth and that pay ore will be encountered as soon as the ledge is reached. A run made from this ledge yielded nearly $12 per ton.

Ten men are employed on the Ward, formerly known as the Feff. The water supply being limited, the claim is said to have paid fairly for the season's run.

Eureka district.—The Lucky S. Gold Mining Company own the claims called Lucky S. Nos. 1, 2 and 3. The formation is granite on both sides; the ledges are well defined, and, though not developed to any great depth, give every evidence of permanency as far as opened. The greatest amount of work has been done on the Lucky S. No. 2. A tunnel was run 85 feet to the vein, from which they have drifted 300 feet, developing a pay chute 250 feet long, varying from 2 to 6 feet; a raise was made to connect with a shaft sunk on the vein, to give them better ventilation. At this point on the vein they have 90 feet of backs. The quartz is honey-combed, carry-

ing a large percentage of sulphurets and iron and a trace of silver. From the tunnel on No. 2 they have cross-cut 75 feet towards No. 3, and have about 20 feet to run yet to reach the vein.

Lucky S. No. 1 has a 44-foot shaft, from the bottom of which they have drifted south on the vein 40 feet. This vein shows a width of from 15 to 30 inches of about $12 rock. During the year the company has made a wagon road 14 miles in length to the mine, erected a 5-stamp water-mill, with capacity for 5 more stamps, and have employed on an average about 8 men through the season.

Lucky S. Consolidated.—This mill was not completed till late in the season, but 150 tons were milled, which returned about $8 per ton. The ore is entirely different in character from anything in this section, and the start being made so late in the season and in very cold weather, considerable trouble was experienced with floured quicksilver and the freezing of pipes. The water supply being short, operations were discontinued till spring; 2 men are, however, employed stoping, and the mill will be started as soon as weather will permit. It is expected the ore will yield from $10 to $12 per ton.

Light's Cañon.—The past season has been a good one for washing and the claims in the cañon have been worked steadily.

Keading, located 8 miles above Ford's, has washed all through the season from $6 to $100 per month. About a quarter of a mile above here Rufus has been box-sluicing steadily and making fair profit. One mile farther up, Louis Mosi, at the junction of East and West Branches, has washed steadily. The results are not known. Mosi has another claim on the East Branch which he is fitting up, on which to work 2 men the coming season. What little work was done here this year paid well, though the amount of gravel is limited in extent.

W. B. Morton, located 1 mile above, on the Honey Lake road, who has been working for several years with good results, has been piping through the season with 2 men from March to October, drawing up $250 per month. There are 2 men on the branch west from Morton's diggings that have washed steadily for three months, cleaning up $200 per month.

Fant & Mayhew, who have worked their claim for the past three years, have had a good season.

Engle Brothers have been at work on their copper mine for about three years, and have opened what is believed will in time be a valuable copper ledge. The lower tunnel develops a ledge over 50 feet in width, varying in value; the ledge carries copper in carbonates, oxides (black), and native. The ore occurs in chutes through the ledge, different in character, but it is believed of sufficient quality and of a character that can be successfully treated at a good profit to owners. The owners are now making a wagon road to Light's Cañon and are opening up the property in a systematic manner.

Eureka Mills.—The property known as the Plumas Eureka Gold Mining Company is owned by the Sierra Buttes Gold Mining Company, Limited, and consists of the Eureka and the outside mines, which consist of the Old 76, Elizabeth, and the Rough and Ready.

The Eureka ledge has been worked from the upper works to the Eureka level a total depth of about 1,500 feet. There are six tunnels on this ledge; the lowest, which is run on a level with the mill, has a total length of over 5,400 feet. From this tunnel two large shafts are being sunk, water-power for the hoisting machinery being applied through a hydraulic pipe carried down through the old works, giving a pressure of 600 feet. The 60-stamp mill is kept running steadily, power being furnished from steam when water supply proves insufficient to drive the

. About 220 men are employed about the mine and mill, and the duct per month is about $35,000. Owing to depth of snow at this tude (about 7,000 feet above sea-level) the outside mines cannot be rked during winter season, but considerable work is laid out for the ning year on these properties, so that they can be worked through the r hereafter. The condition of the mine is reported as better than previous year, the developments on Eureka tunnel showing large erves of high-grade ore.

Plumas Township.—Agassiz & Show, of Boston, whose extensive erations are in charge of Prof. J. E. Mills, have prosecuted work dur- the year, but with many delays. The Mills shaft, which has been k to determine the character and depth of channel of American Val- , is 230 feet in depth, the last 20 feet being in bed rock. From this ft drifts have been run in the bed-rock both northerly and southerly, m which raises have been put up to prospect gravel; but these open- s increased the flow of water beyond the capacity of their pumps, l after two or three breaks the machinery, was taken out and the shaft owed to fill. Professor Mills immediately went east and procured avier machinery, which is now being put in place and will be put in eration early in January, 1885. The present year, with no unforeseen ays, will allow them to thoroughly prospect the channel on the imme- te vicinity, and if the prospect warrants, there is but little doubt t the company will employ a large force of men and operate on a ge scale.

he Riverdale shut down early in the summer. The gravel yielded ly, but the heavy expense of pumping, bad ground, large inflow of er, and insufficient machinery forced them to suspend. There are specs at present of the claim being worked.

he claim of Loring & Leavitt has been worked with varying success, ing at one time been turned over to labor creditors to secure them, l then turned back to the present owners, who are running the drift n the main shaft up the channel, having made about 190 feet advance ce taking the claim, with no important development. More or less rk has been done further up the channel and in Emigrant Hill. But le gold has been found.

n Hungarian Hill, Goodwin & Kelly worked their gravel claim dur- the winter season. But little or no profit was made.

he claim of Orr & Co. was washed early in the season, but, not ing expenses, work was discontinued.

he Claremont Hill Company expended considerable money on their perty during the past two years, some little washing being done early s season, but not paying, work was discontinued, and the property been virtually abandoned.

n the property of the Philip and Oscar Mining Company the lower nel has been driven ahead 300 feet, and, from surveys made, calculat- the dip to be the same between the two upper tunnels, is now hin 150 feet of the bed of the channel.

Iann Brothers have a 5-stamp mill on the Argentine property, which run during the summer on a large body of low-grade ore; but the ult not showing any profit, operations were suspended.

he ledge in the Diadem is from 40 to 50 feet wide, the rock gener- soft and decomposed and incased in walls of slate; very rich rock ften found extending into the foot-wall 3 and 4 feet. The mine has e tunnels—one near the top, another 70 feet below, and the lowest or n tunnel, now being driven on the ledge from Eagle Gulch, in about feet. Very few men are employed, as no mining work is being done

except driving the tunnel. A small arrastra driven by water is the o applicance on the ground for treating the ore, except a hand-mor driven by spring-pole man-power.

Mr. Edman has built a fine saw-mill to supply lumber and min timber for his mine. Excellent roads graded to different parts of mine have been made and the work throughout shows great thorou ness.

In the Halstead, in Rich Gulch, the lowest tunnel is in 300 feet a taps the vein at a depth of 250 feet. At the point of intersection t quartz is very hard, but as the ledge is opened east it becomes softer a of better quality. The last 40 feet show a chimney 16 feet wide of fi looking quartz, probably averaging about $7 per ton. Going west t vein narrows and the quartz becomes blue and very hard. The drift h only been run 40 feet, the last ore being too low grade to mill. Th work was done under a bond to the Plumas Eureka Company for $60,0 but the company did not consider the showing warranted the purcha at that price, so no sale was made. The developments on the lower tu nel have proven the permanent character of the ledge and the pay o From the upper levels on this chute the owners have made several ru with an arrastra, two separate runs yielding $60 per ton and anoth $12 per ton from selected rock. Since the bond expired the owners ha started a new lower tunnel, which runs on the vein from the start. Th is now in over 200 feet, and at 1,000 feet in length will open a vertic depth of 1,500 feet.

North Fork, Feather River.—The result of the year's work on the riv has been encouraging. The old residents have all had a good seaso and the result is a much better year's profit than for several years pa which has stimulated development very much, the greater part bei confined to the Big Flat Channel, between Independence Bar and Sunn side. The river paid largely in early days from the place where it cross this channel down quite a distance but no pay ore was found of a amount till it reached Sunnyside, where it crossed the channel agai From a break in this old channel there was considerable gold taken la in the fall. The results being known, the whole length of channel w relocated between Independence and Sunnyside, and is nearly all bei developed by tunnels.

White & McMillan are running a tunnel at the head of the chan at Independence Bar, which is now 90 feet, the face being loose lava a gravel.

Wentworth & Ballow, adjoining them, expect to break into t channel. They raised 12 feet from face of tunnel and drifted ahead feet, finding the river pitching away from them, and sunk till water p vented further work, but were able to take out two car-loads of grav which contained $4. They are running the tunnel ahead and now to the river.

David Kirkham has also started a tunnel on this channel, but it is o in a few feet. Angus Cameron, Trucks, and Kelly are all running t nels to open their claims on the channel. Bismarck, who is worki on the lowest break from this channel, and whose tunnel is only 300 ya above the old Sunnyside tunnel, has taken out $2,500 during the last t months of the year, and is now fixing up flumes and plant for a g run as the season opens. The Sunnyside has been leased to Kelly Ware for four months.

Lovercool & Brothers, at Dutch Hill, are working about 18 men a leasing considerable ground, principally on Cummings & Banker's H They report a good season and good prospects.

At Carribou there are about 15 men working, organized into small companies. There are a number of Chinamen washing an old claim along the river, who have done well this year.

SACRAMENTO COUNTY.

Most of the bullion is produced at Folsom and Michigan Bar, and principally by Chinese.

The two producing mines at *Folsom* are owned and operated by P. Donovan and P. D. Eckerett, both of which have yielded satisfactorily to the owners during the past season.

The producing mines at *Michigan Bar* are the Arkansas, Hill Top, Welch, Jordan, and Barber. The decrease in production is owing to the antidébris agitation.

SAN BERNARDINO COUNTY.

J. C. Dunlap, of Ontario, furnishes the following description of the mines of this county:

About 20,000 square miles of the vast region comprised in this county are sterile desert, broken up by mountain chains, barren hills, and sunken basins, some of which lie below the ocean level. Within this barren waste the principal mines are found, the great scarcity of water and almost entire lack of feed for animals having prevented thorough exploration and development. Notwithstanding the unfavorable character of the country for mining operations, the richness of the ores has made it possible to carry on mining successfully for many years. Altogether, the mining outlook of San Bernardino County is very favorable for a largely increasing bullion production. Gradually the mineral wealth of this until recently unknown desert land is being disclosed, and the region that but a few years ago was most desolate and uninviting is to-day alive with human industry, delving into the barren mountain's side to disclose the silver lining within. Wherever there is water to be found, there also is found the camp of the pioneer prospector, extending his field of research, perhaps discovering veins of precious metals or that most important element, water, by means of which it is possible to take another step ahead.

Ivanpah district.—The mines in this district were discovered in 1869, and were the earliest silver mines of the county. They are near the northeast boundary, 110 miles from Daggett, the point on the Atlantic and Pacific Railroad from which supplies are hauled. These mines have been worked ever since their discovery, and although the expenses have been heavy the value of the product has left a good margin for dividends. The ores are chlorides and sulphites of high grade. The veins are very small, occasionally opening into large ore-bodies. The country rock is limestone. The greatest depth reached in any of the mines is about 300 feet. Five mines in the district have produced bullion this year and are all worked with profit—the Alley, Stonewall, Alps, Eugene, and Lizzie Bullock.

There are two mills in this district, one of which, with 10 stamps, has been run regularly during the year, crushing about 20 tons per day.

Calico district.—This district was organized in 1881, and is now the most promising one in the county.

The mines are situated in a low, detached mountain that rises abruptly to a height of 600 or 700 feet above the surrounding desert plain. Its

surface is bare rock, and exceedingly broken up by high abrupt cli and deep narrow chasms. It has the appearance of having been a mu higher mountain, now broken up and almost buried in its own *débr* The trend of the mountain is northwesterly and southeasterly. T principal developments have been made in a belt of country 5 or 6 mil in length from east to west by 2 miles in width from north to sout The mineral-bearing ledges are of two classes, vertical and horizont Some of the vertical veins have been worked at a depth of over 5 feet without any contraction of the mineral-bearing rock or decrease i the richness of the ores. In other claims the mineral-bearing rock more than 200 feet wide and lies horizontally, the ore being in pocket

There are about 15 or 20 mines that are sufficiently developed to l classed as regular bullion producers, and about 20 more that have be opened up enough to show the extent and value of the ore-bodies, b sides several hundred locations that have not been prospected suf ciently to determine their value.

One of the greatest bullion producers for the year is the Oro Gran group, comprising the Silver King, Calico Queen, Burning Moscow, an Little Bonanza. These mines all join and are of the same characte The greater part of the work has been done on the Silver King groun There are in this mine 6 levels, of a total length of 4,150 feet, with 9 feet of cross-cuts, all showing mineral. A shaft has been sunk 110 fe below the lower level, and shows a continuation of the mineral. Th ledge on the surface and for 30 feet in depth is spar, below that it soft porphyry, and at the present depth, 550 feet, it is 150 feet in widt The ores are chlorides and easily worked. The mine is in good ord and is systematically managed.

A 15-stamp mill, situated about 5 miles from the mines and about mile from Daggett, is kept running constantly, crushing about 40 ton per day. The company contemplates building a railroad from the mi to the mine at an early day.

The Burning Moscow has a shaft 100 feet deep and about 200 feet cross-cuts and tunnels. It is on the same ledge and in all respects sim ilar to the Silver King, which it joins on the west.

The Oriental mines join the Silver King on the east. The total dept reached is 432 feet, with about 200 feet of tunnels and cross-cuts. Th company has a mill, which is kept running, crushing about 35 tons p day and producing a large amount of bullion.

The Alhambra Consolidated Mining and Milling Company own th Alhambra, Bismarck, Cuba, Odessa, Richmond, Hawkeye, Silverett Dunderberg, and Gobbler claims. These mines are located about mile east of the Silver King.

The Bismarck has a shaft 178 feet deep, showing a vein of pay ore feet wide.

The Cuba has several open cuts, showing good ore.

The Odessa has 250 feet of shafts and 600 feet of tunnels and cros cuts, showing a ledge 200 feet wide, with a wide pay streak of hig grade ore.

The Richmond has an open cut 50 feet long with a drift 35 fe showing a pay streak 1 foot wide of high-grade ore.

The Gobbler has a shaft 50 feet deep and about 450 feet of drifts a cross-cuts. The mineral-bearing rock is 150 feet wide, with pockets good ore. These mines all promise well.

The company's mill is situated 7 miles from the mines; it has stamps and is kept running, averaging about 35 tons per day.

The Garfield group, consisting of the Garfield, Occidental, Thunder

and others, is located about three-quarters of a mile east of the Silver King.

The Garfield has a tunnel 1,000 feet long, showing a vein 125 feet wide, containing pockets of good ore. The other claims in the group are of the same character. The company has shipped a great quantity of ore and is producing a large amount of bullion. The mines are in a condition to largely increase the output.

The Humbug is worked like a quarry. The mineral vein is 200 feet wide, the ore lying in pockets. Some ore is being shipped.

The Red Jacket is west of the Silver King and Burning Moscow and on the same ledge. It has about 400 feet of drifts and cross-cuts. The mineral vein is 125 feet wide, with a large pay streak of high-grade ore. This mine is worked under a lease and has produced some bullion. It now has a mill.

The Mammoth is a small claim that lies within the lines of the Red Jacket and is similar in character. It has nearly 2,500 feet of tunnels, drifts, and cross-cuts. It is shipping ore.

On the same ledge, farther west, are the Josephine, Jessie Tay, and Little Waterman claims, all promising but only partially developed.

The Sue mine, located about a mile west of the Silver King, promises to be one of the leading mines of the district. It has been explored to a depth of 250 feet. At this depth there is a spar vein 30 feet in width, containing a large amount of high-grade ore. This mine has produced some bullion, and the owners propose to work it on an extensive scale.

The Red Cloud, Mountain Brow, Monte Christo, Lone Star, Bull's Eye, Sam Huston, Golconda, Little V, Pinto, Geneva, Lion, Dora Belle, Invincible, Mastadon, Argenta, Waterloo, Dragon, and others are being developed and are producing some bullion.

The De Soto silver mine was located in January, 1884, and considerable work has been done upon it up to the present time. The location is about 35 miles southeast from Calico and 9 miles from the town of Haslitt, on the Southern Pacific Railroad. The ledge, which is 6 feet in width, crops the entire length of the claim. Two shafts have been sunk, one to the depth of 50 feet and the other 12 feet. The former was in ore to a depth of 35 feet, when the dip of the vein carried it away from the shaft. Quite a large portion of the ore-chute at the top of the shaft has been stoped and considerable ore taken out. Two lots of first-class ore from this point milled, respectively, $109 and $107 per ton, and one ton of second-class ore, milled as an experiment, yielded $47 per ton.

In addition to the two shafts, one large open cut has been made across the ledge, which shows very good ore. The mine promises to be a valuable property.

Grape Vine district.—This district is located on the eastern slope of the Sierra Nevada Mountains, about 4 miles from the line of the Southern Pacific Railroad.

The principal mine in this district is known as the Waterman and Porter, which is one of the largest silver-producing mines in the county. The vein is contained in a porphyritic formation, the foot-wall being porphyritic feldspar and the hanging wall porphyritic trachyte. The mineral-bearing belt is fully 100 feet wide, but the vein from which all the ore has been taken averages about 3 feet in width. The mine has been opened to a depth of 350 feet, with drifts run and stopes opened the entire length of the mine. Prior to January, 1883, 9,000 tons of ore were milled, which yielded $39.30 per ton, while the tailings from this

ore showed an assay value of $10 per ton, thus showing that the ore w worked up to only 80 per cent. of its real value.

From January 1, 1883, to April 30, 1884, 15,018 tons were extract and milled, which yielded $23.13 per ton, while the tailings showed assay value of $11.25 per ton. The tailings are being worked at a har some profit. The cost of mining and milling is not so great as mig be supposed, owing to the fact that wood is abundant, and all oth supplies are brought by the railroad at moderate rates. The mill located at the town of Waterman, on the line of the railroad, which is miles from the mine. Water from the Mohave River supplies the mil but all the water needed at the mine for both steam and domestic pu poses must be hauled from the river, which, however, is not an expe sive item. A recent examination shows the different levels and stope to contain large reserves of ore, while the ledge in the bottom of th mine maintains its original strength and richness. There are three othe claims owned by this company, one adjoining the above-described min and two lying parallel to it.

Providence district.—This district is situated about 20 miles in northerly direction from Fenner Station, on the Atlantic and Pacifi Railroad, 103 miles east of Daggett. The principal bullion-producin mine is the Bonanza King, which was discovered a few years ago an soon entered the list of bullion producers. The formation is limeston and porphyry, probably a contact. The mineral zone is of lime an about 200 feet wide. The ore is found in pockets through this minera zone, connected by small leaders. The ores are carbonates of hig grade and easily worked. The mine has been developed to a depth o nearly 600 feet and has a promising outlook.

The company has a 10-stamp dry-crusher mill running constantly averaging about 22 tons per day.

The Perseverance or north extension of the Bonanza King has a shaf down 80 feet, showing a large body of good ore.

The Belle McGilrey group, south of the Bonanza King, has produce some bullion and has a promising future.

The Mozart group, farther south, is being developed and has a brigh outlook.

Exchequer district.—This is a recently formed district, situated abou 25 miles eastward from Providence. As yet no extensive development have been made, but the ledges promise well.

New York district.—This district is situated about 40 miles northerl from Fenner and 20 miles from Providence. The mines were disco ered and a district formed many years ago, but the scarcity of wate and fuel and the great distance to haul supplies have hindered develop ment. The ore-bodies are large, but the grade low. The camp ha recently been looking up.

Messrs. John McBride and William Miller have for several years bee doing assessment work on about a dozen mines, besides prospecting, an their dumps have a large quantity of ore, principally low grade, ave aging from $40 to $60 to the ton. The mines in this district have larg bold ledges.

Mineral Lake district.—This is a recently organized district, situate about 15 miles in a southerly direction from Bagdad Station, on th Atlantic and Pacific Railroad, 50 miles east of Daggett. Some goo ore has been brought from this district, but developments are limite

Lava Beds district.—This district was organized a few years ago, bu on account of the lack of water and conveniences for working, th developments have been slow. The mines are situated about 40 mile

from Daggett and 6 miles from Seymour, a station on the Atlantic and Pacific Railroad. There are several quite promising locations in this district. The ledges are large and some of them carry very high grade ore.

De Soto district.—This is a new district cut off from the Lava Beds, and the condition of the mines is the same as in that district.

Ord district is an old district organized twelve or fifteen years ago. It is situated about 15 miles south of Daggett. There has been a great amount of work done on the mines, but they have never been producers. The ores are principally gold of low grade. The veins are small and of decomposed quartz in granite formation.

Pinacate district.—The mines are situated about 30 miles in a southerly direction from the town of San Bernardino, and near Pinacate Station, on the California Southern Railroad, 26 miles south of Colton, on the Southern Pacific Railroad.

Most of the mines in this district lie in San Diego County. There are 5 producing mines that are in San Bernardino County—the Rosalie, Santa Fé, Avena, Hoag, and Santa Cruz. The ores are free gold and easily worked. The veins are from 8 inches to 4 feet wide, with pay streaks from 2 inches to 2 feet wide, the rock yielding, when worked in bulk, from $5 to $8 per ton; assorted, $35 to $40. The ledge matter is decomposed quartz in a soft granite formation. They have been explored to a depth of 250 feet, at which depth a heavy body of water is encountered.

There are two 5-stamp mills and a number of arrastras running in this district, with a promise of increased milling facilities at an early date. The output has been considerable for the year.

Holcomb Valley placers.—These placers were discovered in 1861, and were worked for several years, producing a very large amount of gold. They are situated 21 miles east and 12 miles north or on a right line 24 miles, from the town of San Bernardino. By the traveled road it is about 90 miles. The mines are located in an irregular-shaped valley or basin on a high range of mountains. There is no water for mining purposes except during the time of the melting of the snow, which is quite a limited season. The mines were worked principally by rockers. The ground in the outer part of the basin was quite shallow, growing deeper towards the center until it is of a depth of 75 or 80 feet. Mining was done on all sides of the basin, working in towards the center, until water was reached at a depth of from 10 to 15 feet. These mines are now almost entirely abandoned. There are several hundred acres of placers remaining that must be rich in gold. When water is brought to the ground a large output of gold may be expected. Some years ago three or four quartz mills were running in this valley and considerable bullion was produced, but work is now suspended.

In Bear Valley, a few miles from Holcomb, are some very extensive deposits of gold quartz, but they are not worked at present.

Lone Valley and Black Hawk.—These camps established fifteen or twenty years ago, are situated about 12 or 15 miles in an easterly direction from Holcomb Valley. A great amount of work has been done towards the development of the mines, but as yet none of them have been put upon a producing basis. The veins are large and extensive. The ores are galena and carbonates, and very refractory.

Eagle Mountain district is east of Lone Valley district. Some good rock has been found and the ledges are promising, but the scarcity of water hinders rapid development.

Dry Lake district lies north of Eagle Mountain. There are a great

many locations and some very good prospects. The ore-bodies ar
but of low grade.

Oro Grande district.—This district is situated about 40 mil
northerly direction from the town of San Bernardino, and near t
have River. The ores are auriferous, of high grade, but the ve
very small and in very hard granite formation. A large amo
capital has been expended in the development of these mines a
siderable bullion produced, but the result has not been satisfacto
fine 10-stamp mill driven by water-power runs a portion of the t

Lytle and San Antonio Creeks, placers that formerly yielded co
able gold, are now but little worked. The work was principally
old deposits high above the present creek bed, by drifting an
sionally by sluicing. The beds of these streams are supposed to
in gold, but no effort has been made to work them.

Morengo district.—This district was formerly known as Rubie
It is about 45 miles from the Southern Pacific Railroad, nort
White Water Station, on the north slope of the San Bernardino
ains.

The principal mine, the Morengo King, is developed by a shaf
110 feet, showing a 4 foot ledge, giving assays in gold from $18
per ton.

The Capital, Scandaloso, and Monitor have shafts down from
feet in depth, all showing equally good prospects. Assays hav
made from the Scandaloso as high as $126 in gold per ton.

About 15 miles east of Twenty-nine Palms Springs severa
ranging from 6 inches to 3 feet have been found. Some of the o
these lodes, worked by arrastra, yielded $100 per ton.

SAN DIEGO COUNTY.

The review of this county was principally prepared by Ch
Fox, of San Diego.

San Diego, although one of the largest counties in California
first one settled, has never been prominent as a mining country
western portion, comprising about one-third of its area, is very
broken by ranges of mountains, running in every direction, wit
little apparent order or system, and the geological formations ar
same character, showing very little regular stratification, but ge
a wash or bowlder formation near the base of the mountains
much broken and shattered granitic upheaval higher up.

Quartz veins are common, and many have been found to contai
but when rich enough to be profitably worked are liable to fa
which the pay ledge is lost or pinched out, and in many case
that have been profitably worked have been abandoned for this

The eastern portion of the county is a desert or ranges of low
ains, running northwest and southeast, and composed of bas
lava rock, with many quartz ledges, which contain silver, copp
other minerals. There are also vast deposits of salt and other m
left by the drying up of the ocean, which formerly covered all
gion. Some of these are being worked, others have been pro
with good results; but the desert character of the country, abs
water, and cost of transportation have prevented permanent
operations, and the whole region is uninhabited and some of it
unexplored.

Julian district is situated about 40 miles northeast of the city
Diego, on the summit of the mountains, at an elevation of from 4

4,600 feet above sea-level. It is well watered and timbered and has much good farming land, producing grain and all kinds of temperate fruits. Some placer mining had been done for several years, but on February 22, 1870, a vein of very rich gold quartz was discovered near the summit of the mountain range where it breaks off towards the Colorado Desert. In a short time a large number of miners and prospectors arrived and a good many claims were opened. Claim was laid to the land by the owners of the Cuzamaca Rancho, which was defeated after several years litigation; but meanwhile it prevented capital from taking hold of the mines. Several of them were profitably worked, as the Owens, Helvetia, Tom Scott, and others, but lack of capital caused their suspension, when the difficulties incident to all mines, such as removal of water, searching for the lead in faults, &c., occurred, and though there are no doubt some good mines, none have been worked in the year 1884 in the immediate vicinity of Julian.

Four miles south Messrs. Ambrose & Buck have prospected a vein said to contain silver in large quantities, the ore bearing some resemblance to the famous Leadville ore of Colorado.

Eight miles south of Julian is the Stonewall mine, which was worked for several years with good results. The gold is contained in rotten quartz, easily mined without the use of powder.

After remaining idle for several years this mine has recently been purchased by Messrs James & French, who are opening it and putting up a 10-stamp mill, employing about 20 men.

There are two 5-stamp mills in Julian—the Helvetia, which is idle, and E. D. Switzor's, which has crushed only about 30 tons of custom rock during the year.

About 10 miles from Julian, Mr. McAuliffe has located a claim which is believed to be very rich, assays from the rock showing values as high as $1,000 per ton. The gold is said to be so fine that it will be necessary to smelt the ore in order to save the gold.

Some ore is being taken from the San Diego, which pays good wages; also from the Blue mine, which milled $118 per ton.

The silver mines located at Julian are being worked and the prospect is excellent for the development of valuable properties. Assays have been obtained which gave values as high as $1,100 per ton.

Banner district.—This district was set off from Julian in 1872, and lies on the eastern slope of the main mountain range, at an elevation of 3,000 to 4,600 feet above sea-level.

In this district the Ready Relief mine is employing about 12 men and running a 10-stamp mill, day shifts, on their own rock. It is a reliable mine, having been worked for several years, though in a small way. Baily Brothers, the owners, also own the Redmond, a northern extension.

South of this the Hubbard, owned by the Cowles Brothers, is running a 5-stamp mill on waste rock, with satisfactory results. With a force of 8 men they are sinking an air-shaft, nearly finished, about 90 feet deep, to connect with the tunnel, 200 feet long, cutting the ledge 200 feet below the surface. The drift on the ledge is in about 400 feet, and on the completion of the air-shaft a larger force will be employed.

Shenandoah district.—This district is situated about 20 miles north of Julian, on the Mesa Grande Mountain, at an elevation of 3,500 feet above sea-level and in a fine farming region, well watered and timbered.

The Shenandoah mine and 5-stamp mill have been worked since early summer. During the wet season, from February 1 to June 20, 1884, over 84 inches of rain fell and the shaft was filled with water, stopping

all mining operations till it was pumped out. This was accomplished in July, and since then a force of 30 to 40 men have been employed taking out rock from the 120 and 170 foot levels, and the mill has been run night and day. The mine is now in good condition.

The claim of J. Hoke, on Red Hill, though only a prospect, has turned out 10 tons of rock with good results, and several other promising veins have been opened and some prospecting done.

Pinacate district.—This district is situated about 80 miles north of the city of San Diego, near the north line of the county. The country is covered with rolling hills, scattered juniper trees, and poor soil. The elevation is about 1,600 feet above sea-level, the climate mild and pleasant, and pure water found in abundance in wells not far below the surface.

The 5-stamp mill of Mr. Hoag is running on rock (gold quartz) from his mine on the Sobrante, and the 5-stamp mill of Mr. Moore is running on ore from the Good Hope mine. Each of these mines is down about 200 feet in well-defined ledges.

Most of the mining in this district for the past three or four years has been done by Mexicans with arrastras. As soon as the water-level was reached by them no further attempt was made to go deeper. Within the past year, however, Mr. Hoag and Mr. Moore have worked their mines, the Good Hope and the Barber, in a thorough, systematic manner, and the result is exceedingly satisfactory. Mr. Moore owns a 5-stamp mill, to which he has added a concentrator to save the sulphurets which are found in nearly all the ores in this vicinity, and which seem to increase in quantity and richness with the depth of the vein.

There are a number of claims here worked by Mexicans, but the veins, though rich, are so narrow that the expense is too great for profitable working. The ore treated in the two mills of the district during the past season is said to have averaged about $35 per ton. Several other claims in this district are being prospected. About 80 men are now at work in the district and the prospects are good; it being within 3 to 5 miles from the California Southern Railroad makes transportation cheap and convenient. A recent discovery of coal in paying quantities in this vicinity is reported.

Rattler district.—This district is situated about 20 miles east of Twenty-nine Palms, on the Southern Pacific Railroad. Mr. T. B. Lyons lately received about $400 in gold amalgam, the result of crushing 8 tons of ore from one of the mines in this district. A 5-stamp mill has been erected near the mines. The main ledge of the district is from 8 to 10 feet in width and carries free gold. Arrangements are being made to increase the milling facilities of the district.

Merifee district.—The Merifee mine is producing some ore that is being crushed at the San Jacinto mill. Extensive preparations are being made to develop this mine, as it is believed that it will prove to be a good property. Negotiations are now going on for the transfer of valuable mining interests in this district which are principally held by Mexicans, and when these transfers have been made good results will follow.

Ogilby district.—This district was formed December 15, 1884, and lies between Yuma and Ogilby Station, on the Southern Pacific Railroad.

The ores of the district are free-milling gold and are found in large bodies of high grade. Two shipments of ore have already been sent to San Francisco and milled, and gave good returns.

These mines were discovered by P. Walters, of Santa Monica, last January. Some idea of the magnitude of the ore-bodies can be formed from

one claim called the Black Butte, which shows a body of ore 40 feet in thickness and 600 feet in length. An open cut has been driven 20 feet into the ledge, which is all in pay ore. Ore from this cut has milled $100 per ton. One other claim has been opened by two cuts and shows 64 inches of ore that will mill $200 per ton.

SHASTA COUNTY.

The following review of this county is by J. M. Gleaves, of Redding:

In pioneer days Shasta County contained numerous gold deposits, which after a time became apparently exhausted, and the attention of the miners being directed to other fields, properties once valuable were abandoned. The completion of the California and Oregon Railroad to Redding brought in a great number of emigrants, who employed themselves in developing the mineral and agricultural resources of this county. The miners, acting upon the theory that where free gold is found in placers there must be feeders of quartz ledges higher up, have partially developed ledges of rich quartz.

Round Mountain district.—A few small placer claims were worked with varying results during the year. The property known as the Afterthought, owing to a disagreement among the owners, remains closed, with no immediate prospects of beginning operations.

Copper City district.—The principal mines are found on and near Killinger Hills and Bully Hill Mountains. The ores are rich in gold, silver, and copper, but, owing to their rebellious nature, have required the expenditure of considerable money for successfully treating. During the first half of 1884 little developments were made. Spruance, Stanley & Co. have leased the Extra mine to a syndicate for ten years. The lease compels the constant working of the mine. Improved machinery has been put in and the bullion output just commenced.

Backbone district, though recently organized, bids fair to be one of the richest in the county. The principal mines in this district are the Windy Camp. The mineral belt on which is located the Iron Mountain and Windy Camp mines consists of a feldspathic porphyry and has been traced for 15 miles, the width varying from one-half to 3 miles. The Windy Camp group consists of eight claims, commencing on the divide between Spring Creek and Squaw Creek, and, with the Coldwater mine, extending in an unbroken line along the mountain side to within half a mile of Squaw Creek.

The principal developments have been made on the Windy Camp and Balaklala claims. The ore is free milling, carrying native silver, silver glance, and free gold. About 350 feet of shafts and tunnels have been made in Windy Camp, showing a thoroughly mineralized mass of ore, the deepest workings being 120 feet below the surface.

The Balaklala mine has a 30-foot shaft and 75 feet of drifts. At the lower end of the claim the ore shows the full width of 600 feet, the mineral being of the same character as the Windy Camp. So far as known, the ore at water-level is a copper pyrite, carrying from 3 to 30 per cent. of copper and about the same amount of precious metals as the surface ore. The proportion of silver to gold is as 5 to 3. This group, lying within 4 miles of the California and Oregon Railroad, with an abundance of wood and water near, promises well.

Flat Creek district.—The principal mine in the district is the Murry, having a 460-foot tunnel, which intersects the 3-foot ledge 100 feet below the surface, and with which it is connected by a shaft; a 10-ton cannonball mill; two concentrators, and other plant. Within the last ten months

this mine has produced $17,000. The ore assays from $25 per ton upwards, and works an average of $17 per ton, exclusive of sulphurets. There are 15 tons of sulphurets, that will produce $200 per ton, at present in the mill. There are other ledges in this district, upon which assessment work is the principal improvement.

Shasta district and vicinity.—The Eastern Star kept up assessment work.

The White mine worked a good part of the summer on rock that averaged $14 per ton, but lately was closed up and the mill, &c., moved away to Old Diggings.

C. J. Kempton's ledge has been thoroughly prospected. New machinery has been put in and the works enlarged.

At Old Diggings, 5 miles north of Redding, several ledges have been found, among which some are promising.

Seamans, Jewell & Co. found a 3-foot ledge that works $25 to the ton. They have partially prospected it and have erected a 10-ton cannon-ball mill.

Rev. G. W. Fleming about a year ago found a 3-foot ledge that prospects satisfactorily. He works, in an arrastra drawn by horse-power, selected ore that averages $90 per ton. His mine is located one mile west of Old Diggings and promises well.

Dan O'Neal's mine, 1 mile south of Fleming's, has produced gold for a year past. He keeps a 10-ton cannon-ball mill busy on quartz that averages $60 per ton. A 300-foot tunnel has been run and various shafts sunk, and all show the ledge to be permanent.

In this immediate vicinity E. A. Reid & Co. have lately found a ledge, upon which a 6-ton cannon-ball mill run by steam has been erected. The ledge, so far as prospected, shows permanency. This ledge, like all others in the vicinity, has paid from the start.

Frank Young & Co. have a couple of 4-foot ledges, upon which sufficient prospecting has been done to establish their permanency.

Near Buckeye there has been considerable pocket hunting done, with varying results. This vicinity in early days was rich in placer diggings, which have been pretty well exhausted, although about 50 miners engaged in placer mining are making wages, on an average, of $4 per day.

Iron Mountain district—This district during the past year has not made much new development. The Lost Confidence mine has shipped ore to Denver, Colo., the returns from which exceed $100,000. This district is rich and extensive, but lacks enterprise. The mineral belt upon this mountain extends some 15 miles, and in one place for upwards of a 100 yards the ledge stands bare above the surface, reaching a height of 50 feet.

The Mad Ox has been well prospected and is paying. It has a 10-stamp mill, which is kept running on ore that pays $20 per ton. The mine has been worked to a depth of 600 feet, and has a 3-foot ledge all the way. This section, being among the first to work quartz, has made steady and permanent progress.

Quite a number of small mines are being developed and are paying.

The placer mines in this vicinity are paying fair wages for about six months in the year; the great want is water.

Senator J. P. Jones owns a valuable mining ditch, the Clear Creek, that would supply water for a distance of 30 miles if kept in repair, and the necessary repairs are now being made. It extends from the Tower House to Horsetown, and, with its side ditches, has a length of 40 miles. When in good order it carries many hundred inches of water and

has on its line many reservoirs, which, when filled, assume the proportions of good-sized lakes. These placers will last for many years, being worked as they are by individual owners.

At Piety Hill the Hardscrabble, hydraulic, gives employment to 10 or 15 men during the most of the year. This mine has produced large quantities of gold, although the best ground has not been used.

At *Townsend Flat*, *Horsetown*, and vicinity are claims worked by Chinese.

Jerome's placer claim is being worked with varying success by a hydraulic elevator.

Four miles south of Shasta, Lowry & Brincard have recently found a ledge that assays $84 per ton.

French Gulch district, is situated in the northwest part of Shasta County, and was noted in early days for its production of placer gold. There is but little placer mining now going on.

There have lately been several rich strikes in quartz in this vicinity, among them the Niagara and Shafter mines. Mr. Coleman, the owner, has recently erected a 12-ton cannon-ball mill.

Thomas Green has a 6-ton cannon-ball mill on his claim and is producing nearly $200 per day.

The Brunswick mine is producing ore that works $30 per ton.

The Franklin mine, owned by J. Souter, has been running for many years on ore working from $8 to $300 per ton.

There are several arrastras in this district that are paying well. The outlook is encouraging.

South Fork and Sunny Hill district.—Few of the South Fork mines have been doing more than assessment work.

The Robinson Brothers & Jamison have a 6-ton cannon-ball mill on their ledge, and are successfully working the ore.

The Chicago mine has recently been sold to San Francisco parties, who have erected new concentrators and expect to fully develop it. Several arrastras are running on good ore, some of which assays high.

This district contains many fine ledges, but the ores are rebellious in character, and the numerous failures to work them successfully have had a depressing effect upon the owners.

In the *Sunny Hill district* a healthy progress has been made.

Sharp, Smith & Day have recently erected a 60-ton quartz mill, which is a great benefit to this district. Quite a number of good quartz ledges owned by men too poor to work them now have a chance to have their ores worked without the risk of large investments.

Bully Chop district.—The Bully Chop mines, owing to their inaccessibility, have made but little progress. During the last year a new road has been surveyed and almost completed to the top of the mountain. Early in the spring, upon the completion of this road, a large mill and reduction works will be erected. The output of bullion during the last year has been large and the prospect is better than ever.

Considerable work has been done on the Pound Cake, Cumberland, and Bully Chop mines, and numerous smaller ledges have been prospected and partially developed. The outlook in this district is encouraging.

SIERRA COUNTY.

The review of this county was prepared by R. L. Dunn, of Auburn.

The results of the year's work in the county have been very satisfactory. The number of mines producing and their total yield have been larger than in 1883, though nearly all of the hydraulic mines were closed

down in August by injunction. The hydraulicking carried on was mo profitable than usual. In drift mining all of the old mines continue their steady yield, and several new mines came to the front as bullio producers. Quartz mining, however, shows the greatest increase in th number of claims worked and in their output. From every district ex cept those whose entire industry was employed in hydraulic minin come good reports as to future prospects; and even in localities en gaged exclusively in hydraulic mining a more hopeful feeling is arisin as to the projected result of enterprises in drift mining on a large scale Some few of the small mining camps will have to be abandoned on ac count of the stopping of hydraulic mining. In Northwestern Sierra tw Wells-Fargo Express offices have been discontinued and mail and trav eling facilities very much reduced. The general business of this sectio has also to some extent fallen off. Sierra City and Forest City, how ever, show improvements which more than counterbalance this decline The following details of the several districts will more definitely sho the present condition of the mining industry.

Gibsonville.—All the mines lying between Slate Creek on the soutl and the county line on the north are in this district. The county lin is here the center of the ridge sloping toward Slate Creek, making th district long and narrow, with many of its mines lying in two counties Gibsonville is a small mining town on the Sierra County side of th "divide," and La Porte, some miles farther down, is on the Pluma County side. Farthest up the ridge above Gibsonville is Pilot Peak around which are several important gravel mines.

The Nevada hydraulic claim paid largely during the water season early in the year. It will from this time be worked by drifting, the in dications being it can be worked profitably by the latter method. Th main tunnel has been run in about 700 feet and an upraise made to th gravel.

Adjoining the Nevada on the west is the claim of the Pilot Peal Mining Company. They have a tunnel in about 3,000 feet, and are run ning for what is known as the Gibsonville and Whiskey Diggings grave channel. Some fair-paying gravel was found in the front ground o the claim, but it is inferred from the known richness of the adjoinin claims on both sides that the best prospects are not yet reached. Liti gation has interfered considerably with the development of this claim but no further difficulty of that kind is anticipated.

Adjoining the Pilot Peak Company's claim on the west is the Nort America drift mine at Hepsidam. This is one of the largest and mos profitable claims in the district. Early in the year 75 men were em ployed; later, at times, as many as 150, most of them being Chines The mine paid steadily throughout the year.

The Union drift mine, at Gibsonville, made excellent returns, thoug at times but few men were able to work, owing to influx of water. It is reported that $3,000 was taken from one car-load of gravel, which rich and abundant.

It is proposed to open up and work the ground between Gibsonvil and La Porte by means of two tunnels, each about 4,000 feet in lengt commencing in Wallis Creek, about 1½ miles southwest of Gibsonvill A third, to be 2,000 feet long, starts from the head of Little Grass Va ley, in Plumas County, about 3 miles north of Gibsonville.

The Iron Bound drift mine has made profitable returns for the year work. One piece of quartz weighing over 200 pounds was taken out i December and is estimated to contain $3,000, a streak of gold one-si teenth of an inch thick running through it.

Howland Flat.—This mining town and district, together with *Saint Louis, Port Wine, Grass Flat,* and *Scales diggings*, are on the divide, on the south side of Slate Creek, opposite the ridge on which are Gibsonville and La Porte. Hydraulic mining having been the method principally in use, all of these districts are seriously affected by the decision of that question.

The Lincoln drift mine has been started up recently after lying idle for a number of years. The company owning it purchased the dumps and other outside plant of the Bonanza drift mine, together with 1,500 feet of its tunnel, and are at present prospecting the front ground. Should this not prove as profitable as anticipated, the tunnel will be pushed further into the ridge.

The Empire Company struck good pay in October, and from that time on to the end of the year have been taking out gold in considerable quantities. Fifty men are employed, the mine yielding about 50 ounces weekly.

Later reports from the Lincoln say that in three of the chutes raised from the upper tunnel gravel paying $3 per car-load has been struck. This is in the front ground, and pays much better than anticipated.

Saint Louis.—The mines in this district are reported to have done well during the year. Morgan, Donahue & Cox's claims paid remarkably well. In the Caledonian drift mine, at Cedar Grove, the main tunnel is being pushed into the ridge, and is expected to cut the extension of the Grass Flat channel at a distance of 3,000 feet.

Port Wine.—O. Liberty's hydraulic mine paid well, though only a small supply of water was available. Work is being resumed in the Queen mine. There is considerable unprospected ground in this district, which, from the yield of ground already worked, should be rich. The Mountain Boy Company are running a tunnel at Bunker Hill to open up some of this ground. It is now in about 400 feet.

Grass Flat.—The Pioneer will hereafter be worked by drifting, and to that end two tunnels are being run, one at each end of the claim.

The Rifle Gold Mining Company have a tunnel 800 feet in their ground, adjoining the Pioneer. But little work has been done during the year.

Judson & Kingdon, at Poverty, have run their main tunnel in 3,000 feet. It is now out of grade, and shafts are being sunk to ascertain how much. The quartz gravel is fine and the gold like flour. No ground that can be profitably drifted has been found yet.

Scales Diggings.—The hydraulic claims at this point will hereafter be worked by drifting. To this end the largest and most important claims have been consolidated under one management. These claims cover 3 miles of the ridge, and should the first work pay will all be tunneled and drifted. The main tunnel will be started from the lower end of the Cleveland and run up the channel. Water-power will be used to operate the cars by means of a cable system similar to that of street railroads. Consolidations of the smaller claims and changes of ownership have made considerable changes in the names of the mines.

Brandy City.—This district lies at the extreme western part of the county, on the line with Yuba County, and the production of its mines is shipped to Camptonville, in the latter county, which is also the depot for its supplies. Owing to this fact some $75,000 of the gold production of Sierra County have been credited in the statements of shipments by express to Yuba County. The mines of this district are hydraulic, but the gravels are not rich enough to work by drifting, and consequently the production of gold has been reduced to almost nothing.

The Honeycomb quartz mine, near Camptonville, after lying idle fc several years, has been reopened, and is being worked successfully A 5-stamp mill has been put up, and has made crushings paying as hig as $18.50 a ton. A considerable body of pay ore is opened up in th mine.

No work has been done on the Mammoth quartz ledge during th year.

Pike City.—The Alaska quartz mine has been running steadily dur ing the year, and, in spite of the difficulty of handling the water, whic at times seriously impeded the working in the lower levels, has mad a large output of bullion, and is, at the close of the year, in better shap than ever for successful working on a large scale. In addition to steady supply of mill rock of high grade for the 20-stamp mill on th mine, in one shift $30,000 worth of specimen ore was hoisted out c the mine. The main shaft of the mine is now down 475 feet, and pump is being put in that will lift 1,000,000 gallons from that depth t the surface every twenty-four hours. From 80 to 150 men have bee employed in connection with the mine, quite a number being timbe and wood cutters, and a great deal of dead work having been done.

Fir Cap or Eureka North.—All of the claims, which are comparativel small and unimportant, are reported as having done well during th year. A considerable area of unprospected ground in this district lyin between Monte Christo and Fir Cap has been bought or relocated an consolidated under one management. A tunnel will be commenced t thoroughly prospect this ground for a channel.

Downieville.—Quartz mining seems to be experiencing quite a revivi in this district. The upper workings of the Gold Bluff mine have bee abandoned and work during the latter half of the year done on th lower tunnel. This completed will be 1,500 feet long and will give 30 feet of backs. Seven men are employed.

On the York mine, in Slug Cañon, more work has been done durin the year than on any other claim in the district. During the early pa of the year several arrastra runs were made, one of 72 tons, averagin $11 per ton, no sorting of the rock being done. The ledge is from 3 t 7 feet wide and is worked through a tunnel. The mine changed hand about the middle of the year, and the new owners, Messrs. Cross & Simons, have put up the necessary plant for the effective working of th mine. An 8-stamp water-power mill, the bulkhead and flume for th water supply, and a double-track tramway from the mine to the mi have been constructed, and are ready to commence work on about Febru ary 1, 1885. In excavating for the mill it is reported a small ledge c very rich rock was struck.

Some work has been done on the Cro quartz mine, and an arrastr run by water-power and having a mill capacity of from 5 to 7 tons dail put up. The ore, which is low grade, averaging, say, $6 per ton, will b taken from the lower of the three tunnels on the ledge and conveyed t the arrastra through a chute 900 feet long. These improvements wer made so late in the year that they have hardly been tested.

The Decatur quartz mine, in Lady's Cañon, about 6 miles from Dow nieville, is being thoroughly prospected. The ledge is very large, an its croppings show on the surface for several thousand feet. Two in clines have been sunk on the ledge and fair prospects obtained. A tun nel is being run that with 200 feet of length will give 300 feet of back on the ledge. Water-power is available for milling and the prospec for developing a mine are excellent.

Hog Cañon.—This locality has been the scene of considerable activi

in quartz mining during the year and many promising developments made.

On the claims of the Express Mill and Mining Company considerable prospecting work and some for the permanent working of the mines have been done. On the Golden Cross a shaft has been sunk 75 feet and a ledge 8 feet wide opened. On the Meadow claim a shaft 40 feet deep exposes a ledge 5 feet wide. Two draining tunnels are also being run.

The old workings of the Good Hope ledge have been reopened, and some fine milling rock is being taken out and milled by P. A. Lamping in his mill.

A ledge close to Lamping's mill has been worked to some extent. A car-track has been built about 500 feet from the mine to the mill, so as to avoid handling the ore more than once. Seven men have been worked. The ore is of fair-milling grade. This mine is the property of D. P. Stewart and others.

The Van Slyke and Maxon claims have also been developed and a wagon road a mile long built to Lamping's mill. The ore from these mines is high grade, milling from $15 to $50 per ton. There is a large body of it in sight.

Several other ledges are being prospected with encouraging results, and this locality, which was unnoticed two years ago, bids fair to develop several valuable mines and to become a leading quartz district in the county.

Poker Flat.—A little work has been done on the Grand Prize drift mine, but no important developments made. It is believed to be a good property.

In the German drift mine 3 men have been taking out from 15 to 20 car-loads of gravel daily. The mine is worked through a shaft 50 feet deep, using a water-power hoist. A large body of blue gravel paying something over $1 a car-load has been opened out.

A rich quartz ledge is being opened by a Mr. Gardner. The ore is very high grade, in places rich enough to pay crushed in a hand-mortar.

Forest City.—This continues the leading drift-mining district in the county. The gold yield for 1884 shows no diminution from that of preceding years.

The *Bald Mountain*, though not producing as largely as formerly, paid well during the year, and has kept occupied in steady employment from 50 to 100 men, the number varying according to the supply of water. The work consisted in excavating the ground which had pillared the mine, and also on ground rented from the Ruby and South Fork Companies. The pillars paid well. In the ground rented from the Ruby Company the gold was found to run in streaks, that taken out being very coarse. The ground rented from the South Fork Company paid well. The Ruby ground was worked from the main tunnel and the South Fork ground from a drift running from Lowell Avenue. During the first part of the season about 100 ounces were cleared up each week.

The Bald Mountain Extension works have been pushed and the mine has steadily paid dividends. During the early part of the year, while the main tunnel was being pushed across a lava flow that cut off the channel, some ground leased from the South Fork Company was worked. In 1883 the South Fork ground, worked from May 1 to the end of the year, yielded $56,834.70, the gravel averaging $2.60 per car-load. The expense of working was $25,873.61, and dividends amounted to $18,949.85. During January, 1884, 36 men were employed and the yield was $9,000. For February and March the yield aggregated $17,000, for April $12,500,

making for the year about $95,000 from the South Fork ground. The total gold yield of the Bald Mountain Extension workings, including the South Fork ground, up to May 1, 1884, was $115,610.64. Assessments were levied during the same time, to develop the property, amounting to $57,390, and about $35,000 dividends paid. The main tunnel has been driven through a lava flow 1,100 feet, and by an upraise of about 50 feet found the channel again about the middle of September. This has been found to prospect well, and preparations have been made to work it on a large scale. An incline in the lava 240 feet long has been run up from the tunnel, and machinery so arranged that the descent of the loaded cars will take up the empty ones and the necessary timbers, &c. A pipe has been put in to carry the water out of the mine and another to bring air in. The breasts have also been opened and gravel taken out through the upraise. The cars are drawn in and out of the 6,000 feet of tunnel by horse-power. The channel being worked is believed to extend for miles.

The Ruby mine has been worked steadily and yielded in the aggregate a large amount, the rich deposits running in spots, so that at times it could not be worked to advantage. During January 44 men were employed, working in three breasts. The gravel taken out averaged $2.50 per car-load and lay about 30 inches deep on the bed-rock. One week's yield was 55 ounces, another 41 ounces. During April 50 men were employed; the yield, $6,526.80; pay-roll, $3,982.50. The gravel taken out averaged $2.30 per car-load, the number of car-loads being 2,880. The mine is worked under difficulties, both gravel and water having to be raised from the breasts to the tunnel by hand-power. In August a body of gravel was discovered on the level of the channel first worked.

In the Wisconsin mine, adjoining the Ruby, no pay has yet been found. The new tunnel, now in 300 feet, is expected to strike into the gravel when 100 feet further ahead.

The South Fork mine has already been referred to in connection with the Bald Mountain and Bald Mountain Extension.

In the Mammoth Spring mine, adjoining the Bald Mountain Extension and the South Fork, an upraise was made from the main tunnel and gravel found that prospected well.

No work has been done in the Savage mine. This claim is well equipped and so situated as to have the advantage of the developments made in the claims already noted in prospecting for pay ground. Over $90,000 has been expended in this mine.

The Homestead quartz mine, on Rock Creek, near the Ruby, reports a strike of some importance. A new tunnel was run, cutting the ledge 200 feet below the old workings. Some very fine ore was found and the ledge is much stronger than in the upper levels. Rock taken from the latter and milled made very satisfactory returns.

Some prospecting was done on a ledge at Forest City, but with what result no report was made.

American Hill.—A little work has been done in the drift mines in this vicinity. Redman & Cadman have been prospecting their ground. In the Bunker Hill mine gravel was found paying $4 to the car-load. Negotiations are pending with an Eastern company for the sale of the American Hill mine. Pay gravel has been struck in the Ballarat claim, at Bunker Hill, 300 feet in from the entrance to the tunnel, but several months' work will be required in which to make the necessary improvements for profitable working.

Alleghany.—The little mining done in this district yielded fair returns

ıe Buckeye Company have their tunnel in 1,700 feet, and, working 7 ın, have been steadily taking out pay gravel. In another drift claim ınnel is being run to tap the Bald Mountain Extension channel. In ·avine claim in Kanaka Cañon 30 ounces were taken out in one day, e nugget weighing 23 ounces.

Minnesota.—Nothing but prospecting work has been done on the quartz ims in this district.

A force of men were employed on the Boles mine, an extension of) Hope and Plumbago, prospecting for pockets. Only one small :ket was found and work was finally abandoned.

Two men have been employed at the Gold King mine running the ınel toward the ledge. The rock is very hard and progress conse- ıntly slow.

Nothing has been done on the Golden Gate or Kenton mines.

A number of claims are working one or two men, but have made no portant discoveries or taken out any pay.

Whipp's Flat.—The Rainbow is the principal mine. The yield for 1884 ıot up to that of 1883, most of the force of men being employed on lower tunnel. In October the ledge was reached by the tunnel and fting commenced toward the pay chute, on which there will be 400 t of backs above the tunnel. Where work was abandoned in the ›er levels the ore milled fully $100 per ton, and large returns are ıected soon, as the pay chimney has been struck in the new tunnel as ı as above, and the new stopes are being rapidly opened. The mine yielded fully $350,000 to date, of which $250,000 has been expended he development of the property, the new tunnel alone costing over),000.

At the Spolun quartz mine, on Kanaka Creek, below the Rainbow, ıe dead work has been done connecting the three tunnels run in on ledge and working toward the chute, that paid well in the old 'kings.

Loganville.—At the Marguerite quartz mine extensive improvements 'e been made during the year, and the mine is now finer equipped n ever before for working the ledge to a considerable depth. The lion output for 1884 is not as large as for 1883, the mine not being rated steadily, owing to inability to control the influx of water in the er levels. Additional pumping and hoisting power has been obtained n a turbine wheel with a 30-foot head, using the same water employed un the mill. The power is carried several hundred feet by a wire e. Forty thousand dollars was expended in improvements and in ning the 400-foot level. The new water-wheel gives power sufficient 'ork the mine to a depth of 1,600 feet. The shaft has been abandoned the mine is now being worked through the new three-compartment ft. In its plant and in the utilization of water-power this is a model e. When in operation 75 men are employed.

Sierra City.—There are but few quartz-mining districts in the State ex- ling this in importance.

he principal mine here is the Sierra Buttes, which has been worked ın extensive scale and paid steadily since its discovery in 1851. Ore been taken out during the year from No. 7 and No. 8 tunnels. No. nnel, starting in at the base of the mountain at Sierra City, has been 'en steadily ahead through the entire year at the rate of 35 feet kly. It is now within a few hundred feet of the ledge, and will e cost when completed about $150,000. A 40-stamp mill has been pleted below No. 9 tunnel, costing $60,000, and it will be increased 0 and 80 stamps as soon as the works are opened from the tunnel.

This mill is remarkably finely appointed, having 8 Frue concentrators self-feeders, and rock-breakers. The Frue concentrators take the plac of the arrastras in the cañon, and a large chlorination plant will b erected during the coming year, contracts for 100,000 bricks for its cor struction having been let. All the machinery is run by water-powe 400 inches under a head of 550 feet being used, with a possible head necessary of 1,500 feet. The ore is low grade, but immense quantitie are extracted and crushed. For the first six months of the year endin June 30, 17,841 tons of quartz were milled, averaging $7.35 per ton, th aggregate being $131,140. The cost of milling and mining is $4.93 ton. From 200 to 300 men are regularly employed. In the last fou teen years over $2,000,000 have been expended in the mine, and durin the same time dividends aggregating $1,360,288 have been paid and i assessments levied.

On the Kentucky quartz mine, claimed as an extension of the Sier Buttes, a large flume has been constructed to bring water from th river to secure power for working a 10-stamp mill. A tunnel is al being run in on the ledge, which will give 150 feet of working back The vein averages 30 inches in thickness and prospects well.

The Colombo quartz mine, probably an extension of the Sierra Butte has been paying steadily through the year, its 20-stamp mill runnin almost constantly. Several improvements have been made increasin the efficiency of the mill. A fault has been discovered in the low levels, displacing the ledge, but no difficulty is apprehended in findin it again. From 60 to 80 men are steadily employed.

The Four Hills mine was discovered many years ago and worked i a small way, but was finally abandoned.

The present owners (Moody, Hull, Sinclair & Reynolds) have recentl begun the development of the mine, and with comparatively a sma amount of work it has yielded profitably. The formation is granite c both sides at surface, but as depth is attained, and toward the southwes the country rock changes on the foot side to metamorphic slate. Th ledge is 40 feet wide, general course southeast, and dips about 40°.

No. 1 tunnel intersects the vein at 150 feet, giving about 100 feet backs. From the intersection they have drifted 100 feet northwest an about 300 feet southeast. At present they are working the ledge only feet wide, selecting the rock, which is worked on a 10-stamp mill owned b the parties, and yields them over 100 per cent. profit About 17 men a now employed on the plant. Competent judges say the ledge will ave age $4. The entire width and explorations made give every eviden of regularity and permanency.

The Young America quartz mine, comprising four locations of 1,5 feet each, is a late discovery, which promises to develop into a very va uable property. It is about 6 miles northeast of Sierra City, and th ledge, from 3 to 9 feet thick, is rich, averaged assays being $50 per to Considerable work has been done—a shaft sunk 150 feet, a tunnel i 220 feet, and a mill site located. The rock seems equally rich wherev the vein is opened. From 5 to 10 men have been employed. A mill being put up.

The Mountain quartz mine, in the same mineral belt as the Youn America, is reported to be a promising location.

The drift-mining claims in this district all seem to be improvin The Rising Sun Company, at Thompson's Ranch, have their main tunn through the rim rock and indications favorable for finding rich grav

In the Blue Gravel mine fine channel gravel and some gold are foun with the prospects steadily improving as the work progresses. Tw men working.

The One Thousand and One gravel mine is at present the leading drift mine in the district. It is located a half mile east of Sierra City and has paid well during the year, employing from 8 to 12 men. The gravel is becoming richer and softer in the face of the main tunnel, and the gold is much coarser. A 5-mile ditch is connected with the mine, which carries an abundant supply of water for washing the gravel during the greater portion of the year. The channel of pay gravel is in places 200 feet wide.

Nothing has been done of any consequence on the Phœnix quartz mine.

Gold Lake.—The lateness of the season interfered considerably with work, but Foss's, Haven's, and Steilman's claims were worked and seem to have paid the same as in the last two years.

Jim Crow Cañon.—R. D. Williams has been prospecting two ledges that seem to show up well. From one of them he worked rock that paid $20 per ton. This vein is between 5 and 6 feet thick at the surface. A tunnel is being run toward it to get working back.

Mountain House.—The Brush Creek quartz mine was not operated at all, but preparations were made to run a tunnel into the ledge to reopen it at an early date. Two men were employed in the American quartz mine below Goodyear's Bar running a tunnel toward the extension of the Brush Creek ledge.

SISKIYOU COUNTY.

This is one of the three most northern counties of California, bordering on the Oregon State line. This large and mountainous county is divided by natural barriers which separate the agricultural and mining sections, so that their interests do not conflict, and *débris* disputes, which have interfered with mining in other counties, will not disturb operations. The rivers are large, and run with rapid currents almost the entire length through deep precipitous cañons, the largest of which are the Salmon, which, with its tributaries, heads in the vicinity of the noted New River mines, and the Scott which heads near the Salmon, but on the north side of the Salmon Mountains. Both flow westerly and empty into the Klamath. The latter, the great river of the north, enters the mineral belt at the mouth of Cottonwood Creek, and flows thence for a distance of 200 miles through a mountain gorge, within which no agricultural land exists and almost every portion of which has been or is capable of being mined with profit. Leaving this region, the Klamath finally debouches into the Pacific Ocean, without bay or harbor at its mouth.

This county has been for years a steady producer, but of late its production from year to year has continually declined. The following review of its mines was furnished by Mr. J. M. Davidson, of Yreka.

Cottonwood mining district suffers more or less from scarcity of water, which, as the last few seasons have been remarkably dry, has checked operations in placer mining. Quartz mining has, however, prospered, and considerable prospecting for quartz veins is being done.

The Ellis placer mine, at the head of Rocky Gulch, which has been worked for ten years, was idle this season on account of the scarcity of water. This mine is worked by the ground-sluicing process, and the labor of 2 or 3 men has yielded the owner yearly from $6,000 to $10,000.

On the western slope of the Cottonwood Mountains, on Hungry Creek, a new claim has been opened, from which $60 per week has been realized as the labor of 2 men by ground sluicing. This will probably lead to more thorough prospecting of Beaver Creek and its tributaries.

Quartz mines.—The California Queen, situated within the Ellis placer

mine, has been vigorously worked with a force of 6 or 8 men, and good results have been obtained. The ledge is small, being from 8 to 18 inches in thickness, but is quite rich, assaying from $20 to $100 per ton. The company has a 4-stamp mill near the mine, fitted with all the latest improvements.

The Mountain Chief has been worked considerably, but no important developments have yet been made.

Mr. J. Jacobs has been energetically prospecting several ledges in this section with encouraging results.

Yreka mining district lies south of Cottonwood. The water supply in this district is insufficient for the working of the mines, except with the aid of water from the "Big Ditch;" but as this ditch, which for four years has been diverted to the east side and used by the Yreka Creek Gold Mining Company, has again been turned to the west side, many mines which for the past four years have been idle, have again started up.

Placer mines.—On Greenhorn Creek the principal mine is the Clark and Company. It is an extensive back channel of said creek, and in seasons when there is sufficient supply of water the company work the mine by the hydraulic process; but for the last few seasons they have not been able to do much by this method and have resorted to drifting, washing their dirt up during the wet season.

Above this claim, in the main channel of the creek, is the Portuguese claim, on which little has been done on account of the scarcity of water. Both of these claims are above the "Big Ditch."

Yreka Creek gold mine is the only claim on the creek of the same name that has been worked. The ground is good, but the difficulty has been the drainage. A San Francisco company undertook to work it with a Cranston elevator, but made a failure. The company stopped work about the first of the year.

On the *Yreka Flats* the most extensive mine is the China hydraulic, situated at the mouth of Spring Gulch. It is said to have yielded over $400,000 since the Chinese came into possession. It has not been extensively worked for the past four years, but since the "Big Ditch" water has again been brought to the west side it will probably start up.

The Pellet and Fruitt mine, in Humbug Gulch, has been successfully worked during the year. Having a prior right to the water from Humbug Gulch, this claim can be worked when others are compelled to remain idle.

Hawkinsville Flats.—What is known as Hawkinsville Flats is the section lying between Yreka Creek and the foot of the Humbug Mountains. It is generally level, with a gradual ascent to the west. The soil is from 1 to 10 feet deep, and the gold is quartz or seam gold. There seems to be little indication of wash, but rather a gradual pulverization of the bed-rock by freezing, thawing, &c.

The John Joseph is the richest mine below the "Big Ditch," and is being energetically worked. This company, together with several others, have rented the "Big Ditch," paying a yearly rent of $3,000, thus obtaining about 500 inches of water, which, by means of reservoirs, is very effectually used in ground sluicing.

This claim employs about 10 men the year round, and there is ground enough to work for years.

The Big Joe mine has been worked continuously during the past year, and the results are very satisfactory to the owners.

The Canal Gulch mine has started up again. It is owned by Rogers & Pereira and is very extensive.

There are many other mines on the flats which yield a fair return to the owners whenever sufficient water can be had.

Humbug mining district.—This district comprises that section drained by Humbug Creek, extending south to the summit of Deadwood Mountains and west down the Klamath River to the mouth of Beaver Creek. The placer mines have been nearly worked out.

The Old Jones claim, on the North Fork of Humbug Creek, the Ben O'Connell and Jones & Son's claims, on the South Fork, have been worked during the year and have about paid expenses.

At the mouth of Humbug Creek the Humbug Fluming Company's claim was in operation, the company doing much better than the previous years.

Below the above claim are the Klamath River mines. The Klamath River is from 75 to 100 yards wide and has a current running about 8 or 10 miles per hour.

The method of working these mines is by means of derricks, the power to run them being obtained from undershot wheels placed in the river. Another wheel runs the pump and still another, called the "dip" wheel, raises the water from the river into flumes, to wash the dirt taken from the cut.

The first claim on the river below Humbug Creek is the McConnell. It is one of the best-rigged mines and for the past three years has been one of the most successful river mines on the Klamath. Mr. William McConnell, the owner, generally employs 45 men and runs night and day from about April or May to freezing weather. He has two large derricks, which are worked so perfectly that not a moment is lost and 60 tubs of dirt per hour are hoisted. He has also two electric lights for night work, which are a great improvement over the ordinary method of burning pitch. This claim yielded about $29,000 during the season just passed.

The Pleasant Bar, Lime Gulch, and Empire Bar claims (all river claims) have been energetically worked and have paid expenses or more.

The Fort Jones claim, the Long Island, and Kanaka have not been yielding more than expenses.

The Knapper Bar and Centennial have paid well.

Quartz mines.—Many new quartz lodes have been located the past year and considerable prospecting has been done. These ledges are all situated in the Deadwood Mountain Range, between Deadwood and Humbug Creeks.

Deadwood mining district.—This district, extending from the summit of the Deadwood Mountains south, embraces the country drained by the Cherry, Deadwood, Indian, and Rattlesnake Creeks.

Placer mines.—The Joe Cardoza claim, on Cherry Creek, which in 1883 yielded $8,000 net, this year did little on account of the scarcity of water.

The Deadwood Junction claim, owned by W. J. Paul, has been taking out from $200 to $400 per week for several months.

The Diggles claim, lately sold by M. H. J. Diggles to a company of Chinamen for $10,000, is now being opened in a thorough manner.

The Oak Grove claim continues to pay well. This is a drift claim and last year $45,000 were taken from one shaft.

The Steamboat, below the Oak Grove, is closed down from the failure of the machinery to drain the mine. The mine is 110 feet deep, but cannot be worked without cutting a drain about 1½ miles long.

On *Indian Creek* the most important hydraulic claims are the Big City, on White's Gulch, which, from scarcity of water, did only moderately well.

The Post Gulch claim, owned by Baker & Jones, which, for the amount of work done, has paid well, yielding about $6,000 for about six weeks' work, with a small head of water.

Owens & Co.'s claim (also known as the Adam Sell claim), the lowest drifting claim on Indian Creek, and lately opened by a drain three-fourths of a mile long, has been disposed of for the sum of $20,000. It has been worked during the last year, but more with a view to opening it up than to thoroughness.

Quartz mines.—The quartz-mining interest in this district has taken a boom during the past two years.

By far the most important discovery in quartz made in this county for years was that of the Schroeder Brothers, at the head of the East Fork of Deadwood, which so far as prospected shows a ledge from 4 to 14 feet in width, the greater portion of which gives a working assay of $8 per ton. There is a seam along the hanging wall of decomposed ocher 8 inches and yielding from $20 to $50 per pan. The owners have panned out several thousand dollars from this seam without crushing.

Tucker & Co. have also a good paying mine on the west side of the Deadwood, but the vein is small, being only from 10 to 18 inches thick. This company have lately completed a 5-stamp mill and are now busy crushing.

Pyle & Co. have also a small vein which prospects well. There are several other promising veins which have not at the present time been sufficiently prospected to report.

On *Grizzly Gulch*, Baily, Brown & Co.'s mine, known as the Bonanza, has been worked during the year with a full force and the quartz has yielded well.

Wood & Anderson, who own the Mount Hope mine, on Rattlesnake Creek, have pushed their lower level through to a small ledge of about $30 rock.

Steward & Strot, on Indian Creek, are working their mine, the work done about paying the expenses of development.

Oro Fino mining district.—Hydraulic placer mines.—The Eastlick and Brothers mine had a good run and cleaned up about $9,000.

The Wright and Fletcher mine also had a good run and cleaned up about $20,000. These two mines have been worked to such a depth that after this year it is proposed to put in elevators. Several thousand feet of hydraulic pipe have been purchased for use in washing off the top dirt, which will probably be done during the winter.

The Campbel mine, on the Quartz Valley side, has done well, making a good run and cleaning up about $40,000.

A new mine in this district, on the headwaters of Turtle Gulch, is being prospected by Abels, Kist & Co., but to what extent is not known.

Quartz mines.—In the Allen and Brothers claim the rock pays about $30 per ton.

Carroll Brothers' claim is being worked; the crushing is done by arrastras.

The Johnson and the Turk quartz mines have not been extensively worked this year.

George Tompkins struck a pocket in his mine and in a few days took out about $3,000.

Many other small mines in this district pay the owners well.

Callahan's mining district comprises the South and East Forks of Scott River.

The mines on the Upper South Fork during the past year have met with their usual success.

The A B C Company's mine, considering the great expense the company incurred in reopening the claim and putting in a new flume, paid well.

J. B. Foch has been working steadily, but, as he is off the pay chan-l, has not made much.

The Montezuma, owned by Alex. Parker, is the best mine in the dis-ct. It comprises about 1,900 yards of the bed of the South Fork and worked by ground sluicing, and a derrick is used to move the heavy ›ks. It has a flume 1 mile long and 6 feet in width, through which e dirt is sluiced. The claim yielded this year $10,000 net.

The Fortune Company's claim has been worked, but not successfully, ›ugh there is good ground which will probably pay well.

The Last Chance and the Bar and Horan were not in operation dur-r the year.

The Kangaroo mine, owned by R. C. Crawford, has been extensively ›rked, but has not paid well.

On Squaw Gulch and French Creek some mining is done on a small ›le, but nothing important.

Scott River mining district comprises Scott River and Hamburg Bar ›tions.

In the vicinity of Scott Bar the mines have not done well this year.

The Maguffay, a hydraulic claim just back of Scott's Bar, has been gorously worked by Thomas Maguffay, jr., with very good returns.

Martin Andrews has for years been endeavoring to open a claim in a ck channel of Scott River at the lower end of French Bar. He has a essure of 500 feet and a heavy 14-inch pipe, but the bank being 300 ›t high causes a great deal of trouble; yet he expects to get into the ck channel by another year.

The San José Company, on Whiting Hill, have been working their ›perty during the year.

In the *Klamath River district* the Leonard claim did very well.

Jerome Beebe has been working a full force, with good results.

Austin & Co.'s claim, just above the junction of Scott River, worked full force, but, owing to the breaking of their dam, did not make ›uch profit.

The Maplesden claim, just below the junction of Scott and Klamath ›ivers, paid very well, working a large force during the whole season, ›ight and day.

The Kittlewood claim paid the best of any on this part of the river, ›bout $15,000 net being realized from the season's work.

At *Hamburg Bar* the Singleton drift claim has been doing well, realiz-›g as high as $50 per day.

Thos. Martin's claim is also working at full blast. These last two ›laims are in a back channel of the Klamath River, and, as they have ›een mined for years, cannot probably yield much longer.

Oak Bar mining district lies between Scott River and the Humbug ›istrict.

The hydraulic mine of the Lang boys on Bark House Creek, has, from ›carcity of water, done but little.

The Rider and Fabricius mine, on Little Humbug, has not, for the ›ame reason, done much.

Dogget & La Source, at the mouth of McKinney Creek, have had a ›ll force at work all summer, but the claim has not paid very well.

The Jackson and Crary wing-dam claim was run at full blast, but ›he expenses were so heavy that, though some rich ore was encountered, ›o profit was made.

The Poverty Point mine, owned by Barton, has been run the whole ›ason and is looking well, but has not paid during the year.

There are several large claims, working from 10 to 30 Chinese each, ›hich are said to have done well.

Sciad Valley mining district.—This section is just coming into noti as a mining region. The mines, which are principally back channels the Klamath River, are very extensive, and water to work them by t hydraulic process is abundant.

The Lowden claim has been run to its full capacity, giving good turns, and has ground enough to last for years.

On the opposite side of the Klamath River is the M. B. Phillips clai on which development work is but just started. A new ditch, carryi about 1,500 inches of water, has been completed to this claim.

Mr. A. Meamber and W. F. Grider have started a ditch to bri water from Grider Creek into a high wash near the mouth of said cre This ditch will also carry 1,500 inches of water.

The hydraulic claim of William Woods has been in full operat this year. This is an extensive claim and has a good supply of wat

The claim of C. M. Bailey is similarly situated and has also been full operation.

Salmon River district.—This section comprises all that portion of S kiyou County south of the Salmon Range of Mountains. It has b worked on a small scale since 1851, and hydraulic enterprises ar comparatively new thing.

The Salmon Mountains attain an elevation of from 6,000 to 10,(feet above sea-level, while the river-beds are not more than 2,000 fe In the wearing down of the immense cañons of this section, the rive which are all large, have left high channels above their present be sometimes a mile or two in length, and these channels are genera very rich and only require water to be made paying mines. This c be obtained at a few thousand dollars' expense.

This section is divided into the *Liberty*, *South Fork of Salmon*, *Fork Salmon*, and *Cottage Grove mining districts.*

Liberty mining district comprises the section drained by the No and Little North Forks of the Salmon River, White's and Eddy's Gulch Sawyer's Bar is the principal town.

On Russian Creek nothing of importance is being done.

On the North Fork, above Sawyer's Bar, Messrs. Kennedy, Hug & Co are starting an enterprise to bring the waters of Russian Cr on to some high bars and a back channel above White's Gulch. T enterprise will take some time to complete.

S. L. Finley, at the mouth of Eddy's Gulch, has been working a fo of 8 or 10 men this season, but the claim has not paid very well.

William Burnes's claim, on Eddy's Gulch, has been running as us and paid about the same as last year.

The Paradise Flat claim, owned by Meyers & Smith, has been worl continuously this year, and the owners have done well. This is a d claim in a back channel of the river; the main tunnel is 800 feet lon

Girard & Beoins, on Bestville Flat, have just completed a ditch eral miles long, bringing water 300 feet above the old Bestville chan They have not commenced work yet, but have their pipe laid and ready as soon as water comes. They have an extensive mine.

The Whistle Bear, owned by Chris Barry & Co., is doing finely. T claim was opened two years ago by a flume from the North Fork ab 1 mile long. The claim is worked by an open cut and derrick and for several months during the year yielded from $500 to $1,500 week; 5 men are employed.

This claim is on the back channel of the North Fork and is ab three-fourths of a mile long. As the method of working is slow, claim will probably last for years.

Below this claim, in a channel above, is the Hickey, a hydraulic mine of considerable importance. It has been run to its full capacity.

Below this, on the North Fork, is the claim of Geischen & Kellner. This claim is a river claim, just being opened by means of a flume from the river.

Next below is Gus Mohr & Co.'s claim, a river claim, which has been worked continuously for years. It has been a paying mine, and this year has often averaged $1,200 per week for 4 men's work.

The claim of Bigelow & Co., also a river claim, and a new enterprise started this year. A flume and ditch about three-fourths of a mile long bring water into the claim to run a hoisting wheel. This is a prospecting enterprise and the company did not get onto the lode until late in the season, but when washed out were making from $8 to $10 per day per man.

The Russian and Red Hill placer mines are next below. These are hydraulic mines in a high back channel of the river, and yield, with the limited supply of water, from $4,000 to $6,000 a year. This company is intending to build a ditch and flume from the Little North Fork to the claim, for more extensive workings.

Quartz mines.—The returns from the quartz mines of Liberty district have not been so encouraging as those of last year.

The famous Black Bear mine is closed, but whether permanently or not is not known. It is evident, however, that the amount of quartz is limited.

The Evening Star has done but little, and the Niggerville Gulch mine has been closed.

The Klamath, which has been closed for some time past, has been successfully operated during the year and has paid its regular dividend.

The Uncle Sam, owned by Sheffield & Co., has been working a full force the entire year, and is reported as being the best-paying mine in the district.

South Fork of Salmon district.—This district joins New River mining district, in Trinity County, on the south, and Liberty mining district on the north. It is extensive and is also a find field for new operations.

The old Peter Miller claim, now owned by Spooner & Co., has been worked with a full force and several acres of bed-rock have been stripped, yielding $9,000 in gold dust.

The company have many acres and are constructing a new ditch to bring the water higher, at an anticipated expense of $15,000.

The W. L. Thomas claim, which lies a few miles below this, has not done very well, as the claim is not fairly opened, the past two or three years having been employed in digging a ditch which has just been completed, and another year will be employed in thoroughly opening the mine.

There are several other promising mines near by, but, being owned by men of small means, they are not properly rigged for economical working.

On the East Fork of Salmon the only two mines worked are the George and the G. G. Brown, both hydraulic, but are worked on a small scale.

Forks of Salmon district.—This district comprises that section lying between the Liberty and South Fork of Salmon districts, down the North and South Forks to the Forks of Salmon and thence down the main Salmon to the Klamath River.

The mining here is principally hydraulic and there are several extensive mines, among which the most noted are the Butcher's Flat placer, situated at the mouth of Knownothing Creek. It is owned by J. P. Fyfield and embraces about 116 acres, which pay well, though worked on a small scale.

The Bloomer and Hammel mine, recently sold to N. P. Bennett, is now being extensively worked, a new ditch having been constructed to it.

The Shumway and the McNeal and McLaughlin have been worked with good results.

J. E. Horn is also working a fine claim at the Forks of Salmon.

In the Forks of Salmon and South Fork of Salmon mining districts there is considerable excitement about quartz mining, and many new ledges have been located at the heads of Knownothing, Methodist, Plummer, Mathews, and other creeks heading with New River, and many rich specimens have been found, but sufficient has not been done to determine the extent of richness of the mines.

Cottage Grove mining district.—This district comprises all of the section drained by the Klamath River from the Del Norte County line to the mouth of Salmon River, and is almost entirely undeveloped.

There are a few hydraulic claims in working order, but they are worked on a small scale.

The Stenshon mine is very extensive and pays well when worked; but little, however, has been done on it during the year.

Halverson & Co.'s mine, the Elliott Brothers mine, and the Old Road mine have been worked systematically, though on a small scale.

STANISLAUS COUNTY.

La Grange is the principal mining camp in the county. It was settled in 1849 by a party of Frenchmen, who named it French Bar. In 1860 over 300 men were at work in the placers and hydraulic mines.

The La Grange Ditch and Hydraulic Mining Company's mine is up to the present time still valuable.

On the north side of Tuolumne River there is located a small mining camp named *Gasberg*, in which are some valuable placer diggings.

In 1879 a rich quartz mine was discovered 4 miles north of La Grange, which, after having been equipped and operated about eighteen months, was closed, and is still lying idle, although the ore was as rich when the mine closed as on the day when the ledge was discovered.

The mill connected with the mine has 10 stamps, amalgamating pans and plates, settler, and concentrator, and is run by water-power constructed in rather a novel way. There is a stretch of 640 feet of wire cable running from the north to the south side of the river. It is connected with shafting on the north side, where the mill is situated, and thence, running across the river, connects with an iron turbine water-wheel, which is turned by the Tuolumne River, thus giving immense power to run the heavy machinery.

About 7 miles northeast of town is a placer named Forty-nine Gulch, where in former years a large sum of gold was taken out by Mexicans, and in which there are still claims yielding gold in moderately paying quantities.

About 10 miles east of town is located the Daisy mine, which is yielding about $50 per ton.

At *Knight's Ferry* there are several private mines, owned by James Prunty and Andrew Hamm, which are producing.

The Chinese are making a small production, but the amount could not be ascertained.

TRINITY COUNTY.

The following review of this county was prepared by T. E. Jones, of Weaverville:

The condition of placer mining in Trinity County has changed but little during the year:

Some new claims have been opened, but as a rule they were of small production capacity. As deposits were worked farther back from the rim-rock of the higher benches greater quantities of water were required, but the available water privileges located many years previously were used and needed for supplying the old claims, and consequently prospectors found little encouragement to search for new deposits. From the permanent character of the old mines, many years will elapse before they will be worked out, and the water now used in them can be spared for other localities.

Under the first construction of the United States mining laws it was generally believed that the section of the statute requiring annual labor applied to quartz and lode claims only, and that it was unnecessary to perform annual labor on a placer location in order to hold it. Under this mistaken impression large quantities of mining land were located by different parties, it being no uncommon thing to find ten, twenty, and as high as fifty locations made and recorded by one person or association. However, the superior courts of this State and of the United States have given the law such a construction that it is now generally understood that annual labor must be performed upon all mining claims, and many locations which had been held for years are now recognized as forfeited and open for relocation. This fact has stimulated prospecting and will have a beneficial effect upon the placer-mining industries of this county. The county suffered in consequence of another poor mining season and produced less placer gold than usual. The returns from the quartz mines, some of which were opened this year and others more thoroughly developed, have about brought the year's product of gold up to the average.

Cinnabar district.—Owing to the low price of quicksilver, and litigation between the stockholders of the Altoona Company, the production of this metal is practically suspended.

Trinity Center district.—There is little change in this district. The Bloss and McCleary, Shoo Fly, Coyle, and Ella May placer claims are located close to the town of Trinity Center. The Nash deep gravel and Morrison Gulch are on Coffee Creek, the former 20 miles and the latter 10 miles distant.

Climax Gulch is some distance east and the Sanford mine about 10 mile southwest. All the above are worked by hydraulic process except the Ella May, which is a drift mine. There are also some smaller claims where occasional mining is done.

Eastman's district.—The Venetia mine has about 200 tons of ore on the dump and is now crushing. The output of the mine has been over $20,000 during the year.

The Hickey and Newman and Hurlburt mines are both in this district and are showing some good quartz, but during the past season have not yielded much bullion.

The English Tom, J. H. Smith, Bolt's Hill, and Ferry Gulch placer mines have given fair returns, especially Bolt's Hill, which, under the superintendency of Mr. John Yull, has redeemed the lost ground of the previous year.

Lewiston district.—The mines in this district are placers, of which the P. Corwin, Chamberlain Brothers, O. Philips, and the Custer Bar Company have been at work as usual.

A large number of small claims are worked by Chinese, one company of which took out about $5,000.

Indian Creek district.—The only claims of any note in operation here are those of O. Connell & Co., Keefe & Hennessey, Collins & Co., Rodgers Brothers, and the Panwicket, owned by A. W. Smith.

Many former placer miners of this district have turned their attention to prospecting for quartz in the *Bully Chop district*, at the head of Indian Creek.

Douglas City district.—The claims of Horst & Eliason, J. A. Hubbard, C. D. Tournot, and several owned by Portuguese miners were worked during the year. Besides these a number of claims were worked by Chinese.

Two miles up Weaver Creek, Messrs. Hughes & McKenzie found a season's work in a point not heretofore prospected, which paid well. McKenzie & Cruthis have fitted up a portion of Union Hill which has not been worked for several years, and they have very fair prospects.

Weaverville district.—This continues to be the leading placer-mining district of the county. Some of the claims have been worked for the past twenty-five years, but none of them have attained any great depth. The cement or false bed-rock, carrying the deposits, occasionally reaches 70 feet, but in the majority of instances not more than one-half that depth. Weaver and Rush Creeks, the only sources of water supply, have been in the hands of the same parties for many years, and as the mines require large bodies of water for successful working, there is little opportunity for mining in a small way. Many mining claims operated previous to the introduction of "giants" have been gradually concentrated into a few large claims, most of which are now held under Government title. The Sidney Hill, McMurray and Hupp, Garden Gulch, Rule Brothers, Harvey Brothers, Esing and Co., London Brothers, Spanish Frank, and Democrat Gulch claims were all worked by hydraulic process during the past season. Some few small claims were worked both by white men and Chinese, by the more tedious process of ground sluicing or drifting.

Junction City district.—Next in importance to Weaverville is the Junction City district, comprising the claims on both sides of the Trinity River for a length of nearly 10 miles, including some important mines on.

Oregon Gulch.—The Joe Ham, Chapman and Fisher, Gribble, Good Friday, Sheridan Brothers, Sturdivant, Perkins Bar, Haas and Hager, and Keno Flat claims are all good properties, located on either side of the Trinity River, above the junction of that stream and Cañon Creek. Below the last-named place are the McKinney, Tower, Segalia, Evans and Bartlett, Mammoth, Henry Jacob, Barthol Jacob, and Parks's Bar mines, the last six being at or in the immediate vicinity of the famous Red Hill. On Oregon Gulch are the claims of O'Connor & Ryan, Schafber & Lyons, and the Ward mine, the latter being the property of the Trinity Hydraulic Mining Company. This company has about 400 acres of mining ground, extending from the foot of the mountain on Oregon Gulch to across the dividing ridge which separates the Junction City from the Weaverville district. This mine has been in the hands of the present company for about ten years. During the last few years operations have not been very remunerative, owing to an insufficient supply of water, and to the use of the limited supply in opening up the claim at its lowest point. The outlook for the coming season points to a largely increased yield from this mine.

The company lacks means to bring in a sufficient supply of water, which should be done.

Mr. Hayes purchased the Keno Flat, McKinney, and Pickett mines, all of good repute, and has since, at a large expense, constructed a ditch from Cañon Creek capable of carrying a large supply of water to these mines. This ditch is 8 or 9 miles in length and will reach the Trinity River several hundred feet above its bed. The water will be forced across the river by hydraulic pressure and raised above the surface of the mines.

terprise has been in progress for about three years, and the ex-
ttending it was considerably greater than at first anticipated.
ter, when across the river, will cover a large amount of mining
in addition to that owned by the company.
Bar district.—In this district the mines of North Fork Township
nded, there being but few miners at work except in the vicinity
s Bar.
's drifting claim continues to pay.
proprietors of the Willshier and the Taylor Flat Mining Compa-
ve changed hands and better results are looked for.
nder Pelletrean's drifting claim, at Swell's Bar, can be worked
the season of low water.
laims of Miller & Co., Bordes & Co., Johnson & Hull, and two
other companies, and many Chinese companies working in this
, pay in a small way.
r *Trinity and New River districts* adjoin in New River Township.
eliable information the yield from the placer mines in the two
s is estimated at something over $20,000, mostly taken from New
nd its branches, and in nearly equal proportions by white and
miners. The quartz excitement on New River has drawn many
hite miners from the placers, and will be hereafter noted when
e is had to quartz mining.
e *Minersville, Cañon Creek*, and *Hay Fork districts* no operations
en carried on except in a small way.
tz mining.—Some attempts were made in prospecting for quartz
county some twenty years ago, but the ignorance of prospectors
ailures.
in the past three or four years, however, the quartz-mining in-
has received an impetus which bids fair to make it the para-
business of the county. There are five districts only which have
hown developments of sufficient importance to take them out of
of mere possibilities. These are the *Eastman, Deadwood, Bully
Enterprise*, and *New River.*
Choop district is situated on the headwaters of Indian and
g Creeks, in Trinity County, and extends some distance over the
o Shasta County. This district takes its name from the Indian
f the mountain on whose sides it is situated, "Bully" signifying
mountain and "Choop" a needle or other article having a sharp

Bully Choop and Occidental Company has erected a cannon-ball
ring the year, and crushed some rock in the latter part of the
stopping when the weather became too cold to operate to ad-
e.
ication has been made and granted to construct a toll-road from
in Shasta County into the western part of the district.
Central, Cumberland, Mammoth, Excelsior, and Pound Cake
re all in this district.
of the gold produced by the above mines is shipped through
County, and no accurate figures could be obtained as to the
of their production for 1884.
Pound Cake and Central have each a small mill.
ins Brothers & Co. also own a small mill; also a ledge of pay-
, the name of which could not be ascertained.
the completion of the toll-road from the summit from the Shasta
s probable that a movement will be made by the Bully Choop Com-
construct a road from their mine to the mill that will open the
s for developing this district which it does not enjoy at present.

Enterprise district.—This district is located on a fork of Trinity River, a stream which in the early days of mining yielded large quantities of quartz gold. The existence of quartz veins in this locality has long been known, but the crude efforts of the first prospectors resulted only in failure. Many years after, Henry Engle discovered a ledge and built an arrastra to work it, but after trying unsuccessfully for years, abandoned it.

In 1882 Messrs. Day, Moore & Hubbard found a ledge which developed into a paying mine. The success of these parties encouraged others, and some properties were discovered in 1884 which were sold for good sums. Another year will probably show more activity in this section, as a company has been incorporated to work these mines. Of the mines thus far discovered may be mentioned the Lone Jack, Enterprise, Star, Ozark, Salt River, and the Ida, Emma, and Antelope, the last three being the properties conveyed to the above-noted incorporation. A small amount of placer mining is also done here.

Deadwood district.—This district lies partly in Trinity and partly in Shasta Counties. The Vermont, Bartell, Bismarck, Brown Bear, Black Bear, M. Klein, Philips, Montezuma, and Enterprise, located here, have shown good developments and in some cases yielded satisfactory returns to the owners.

The Brown Bear and Bartell have been the principal bullion-producing mines this summer. The latter made several runs which yielded $1,000 per day, the runs being of from eight to twelve days duration.

The Black Bear, owned by Mr. J. E. Gibson, is also a good-paying mine.

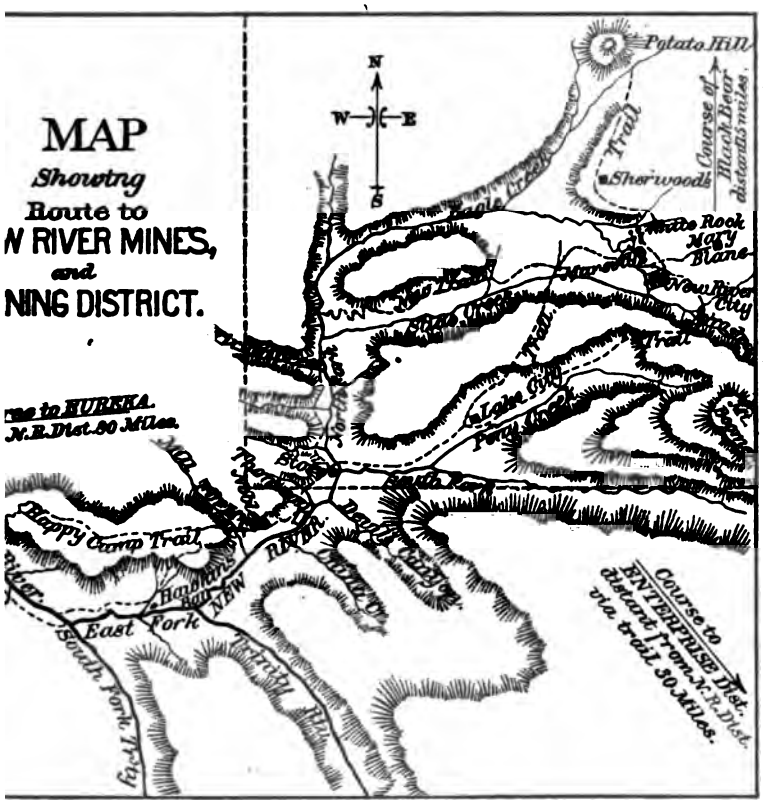
The Live Oak and Deadwood each produced some bullion.

The total amount shipped from the district by express was about $69,000, while a large amount is known to have been taken out by private hands.

New River district.—Unless the indications are misleading, the great quartz section of this county will be found in this district.

Prospecting has been going on here for a number of years, but evidently too low down on the mountain side. Last year some fine discoveries were made, and quite an excitement followed, which acted so powerfully in attracting miners to the district that at the time the winter rains set in the population, which in ordinary times had numbered 20 or 30 miners, had increased to 200 or 300. Many discoveries and locations were made, and upon some of them the developments indicate that the mineral belt is rich and extensive. With the opening of spring operations are expected to be resumed and show a considerable yield from this hitherto comparatively unknown region. On the following mines sufficient work has been done to show permanency, viz: Mountain Boomer, Hard Luck, Ridgeway, Mary Blaine, Yankee Boy, Golden Gate, Armstrong, Tough Nut, New York, Ellen, Cleveland, Saint Elmo, Claremont, Headlight, and J. T. K.

There are two ways of approach to these mines: one by the way of Eureka, Humboldt County, the other by the way of Weaverville. There is good wagon-road communication to within 40 miles of the mines by the latter route, and the balance must be made on horseback. The camp being at an altitude of between 3,000 and 4,000 feet, it is impossible to prospect there in the winter season. The route via Eureka involves a much longer horseback journey, and it is probable the Weaverville route will be preferred. In conclusion it is to be noted that 1884 has been a bad year for placer mining in Trinity, owing to the light rainfall in the early part of the rainy season, furnishing the smaller claims only a few days' supply of water. The increased gold product from quartz has, however, helped to make a respectable showing for the season.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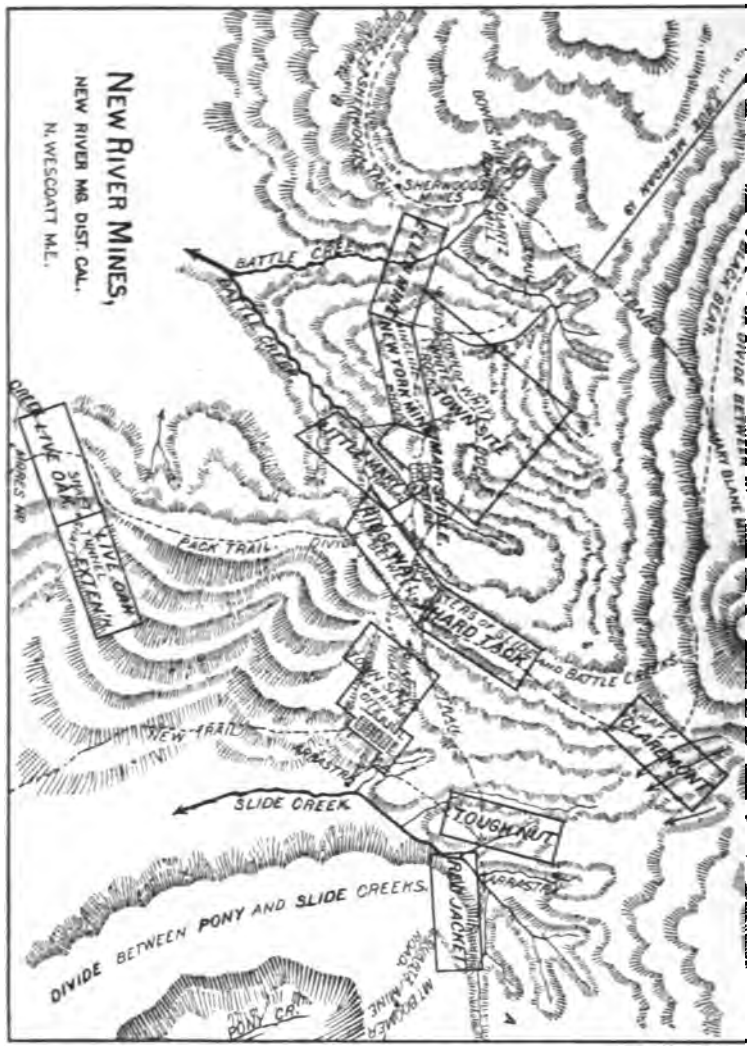
East Fork
Course to ENTERPRISE Dist. distant from N.R. Dist. via trail 30 Miles.


NEW RIVER MINES,
NEW RIVER MG. DIST. CAL.
N. WESCOATT M.E.
BATTLE CREEK
PACK TRAIL
NEW TRAIL
SLIDE CREEK
DIVIDE BETWEEN PONY AND SLIDE CREEKS.
PONY CR.
HARD TACK
TOUGH NUT
RED JACKET
CLARENDON
NEW YORK MINE
MAMMOTH
SHERWOOD MINES
DOWNIE MINE
DIVIDE BETWEEN

The following claims in this district are worthy of mention, viz:
The Mountain Boomer, which has an incline 20 feet and shaft 12 feet.
The Hard Tack, which has a vein 15 inches and shaft 62 feet deep; rifts at bottom 30 feet.
The Ridgeway, with a tunnel 100 feet on vein 20 inches.
The Tough Nut, with a 16-inch ledge.
The Gutson, with an adit level 50 feet on a 2-foot ledge.
The Nevada, on a vein 15 inches with a shaft 4 feet.
The Yankee Boy, with a vein from 5 inches to 30 and a shaft 7 feet; lso a 5-stamp mill.
The Anchor, with a 15-inch ledge; $115 rock; shaft 4 feet.
The Armstrong No. 2 has a 4-foot vein.
The Hunter has a vein 16 inches
The Live Oak, with a 2-foot ledge and a 50-foot adit level on vein.
The Mary Blaine has an incline shaft 30 feet, a 5-stamp mill, and a aw mill.
The Armstrong No. 1, with a ledge 15 inches to 24, showing free gold.

TULARE COUNTY.

White River.—The Bald Mountain Company is still pushing, with two shifts, the west level of its mine. From the mouth of tunnel to the vein is 1,600 feet. From the end of tunnel to the end of west level is at present about 850 feet. Since cutting through the Doc George Chute, which this tunnel was specially intended to develop, this level has revealed only barren ground.

The old Grizzly mine has suspended work for the present.

The Redfield mine, upon which there is a ledge of 12 feet of $12 ore, is having a shaft sunk to a depth of 600 feet.

Mr. D. B. James, acting in the interests of San Francisco parties, has for the past six or seven weeks had from 6 to 10 men employed in reopening the old Josephene mine and in constructing a wagon road from the mine to the mill on the river.

The Josephene is a slate formation, which very much resembles that in which the Hill ledge occurs in Mariposa County, and although its workings have reached only the depth of 100 feet, the ore was so rich it has produced nearly a quarter of a million dollars.

Like many other mines worked in this camp, the Josephene has lain idle a long time, but now its rest is broken. At the bottom of the main shaft the walls are filled with solid quartz 5 feet thick. From the bottom of the shaft a level has been started west and is now out 30 feet. From the shaft to the end of this level the ledge gradually decreases to about 15 inches in width, but with indications of thickening again. The quartz in the big bulge will pay about $15 per ton. At the end of the 30-foot level it will pay $30 per ton free gold. In addition to this body of free gold, the whole body of ore is a mass of sulphurets. There are a number of other mines being worked here.

TUOLUMNE COUNTY.

A. B. Beauvans, of Columbia, has prepared the following review of this county:

Whiskey Hill district.—The Alabama is the only mine at present in active operation. It has a 40-stamp mill running on low-grade ore, which is said to yield a fair dividend over and above working expenses. Along the upper and eastern side of the main or mother lode is a very

extensive deposit of this ore, which is easily mined and can be delivered to the mill at mere nominal cost.

Quartz Mountain district.—The Heslep mine, owned by the Quartz Mountain Gold Mining Company, is still in active operation, and is one of the oldest locations in this vicinity. It has a 20-stamp mill, running on low-grade ore with satisfactory results. The company are sinking a new shaft near the north end of the mine to connect with the old 400-foot level. This will facilitate the development of the mine and also reduce the working expenses.

On the App mine work has been renewed near the north end, opening up on a fine pay chute of ore. A 5-stamp mill has been erected, which is in successful operation. In this vicinity are located the Sweny, Dutch, Knox and Boyle, Gray Eagle, Miller and Holmes, and Golden Rule quartz mines, none of which are working to any extent; the Knox and Boyle quartz mill is, however, running at intervals on custom rock. Besides the above, quite a number of pocket mines are worked with varied results; among them are the Bogan and the O'Donnell locations.

Jacksonville district.—The Clio, Kelley, and Willetta quartzmines are in this district.

The Clio and Kelley have been idle for a number of years. The Willetta has been in active operation during the past year. Near the mine, on Kanaka Creek, it has in successful operation a 10 stamp mill, run by hydraulic power, with 250 feet pressure applied to a 4-foot knight wheel. The ore is low grade, but found in large deposits easily obtained, and is delivered at the mill at nominal cost.

There are pocket mines in this vicinity which are reported to be paying exceedingly well, especially the Whetto and the Sanders.

Big Oak Flat district.—None of the mines in this district are being worked to any considerable extent. On Indian Creek, in the neighborhood of Groveland, Mr. Ch. L. Lang, during the last year, opened up a new location, which has encouraging indications.

Sonora district.—In the Bonanza or Divoll a tunnel is in course of construction which is intended to open up the mine below the level of the present workings.

The Big Nugget mine, adjoining the Bonanza on the southeast, is being prospected.

The Stockton Mining Company have several claims worked, it is said, with satisfactory results.

There are also a number of pocket mines worked in a small way, some of which are said to have yielded quite a large amount of gold during the past summer. The principal among them is the Garrett mine, at Brown Flat.

Columbia mining district.—On the north slope of the mountain, above the left bank of the South Fork of the Stanislaus River, are located the Golden Era, the Hope mine, and the Rifle quartz, all of which have been worked during the past summer with satisfactory results.

The Oakland Mining Company have several locations near the top of the ridge south of the Rifle, principal among which is the Auburn. A deep shaft is being sunk for the purpose of thoroughly developing this property. A 5-stamp mill, run by water-power, has been erected on the ground and is conducted with good results. The present indications are favorable.

The old Tuolumne quartz mine is located on Wet Gulch, about 1 mile west of the Rifle and Oakland Company's mines. During the past

ear the company have erected hoisting works and have pumps in place, ith the intention of fully developing this mine.

The Keltz quartz mine lies several miles east of the Rifle. During he past year the company have been working a few hands prospecting he lower levels.

Among the pocket mines which have been worked with more or less uccess may be mentioned the McKenny and Hasting mine, at Yankee Hill, and the McPherson and Helton, and Hudson and Stucker, at Saw Mill Flat.

American Camp district.—The principal locations are the Tiger, Star, Argentum, Sonnet, and Riverside, all of which are at present idle.

Confidence mining district.—The Lamphear is still in active operation and being extensively developed, with good prospects.

The Green mine, which was paying remarkably well a year ago, is at present closed down; also the old Confidence and the Independent mine.

Soulsby mining district.—The old Soulsby mine is reported to have lately struck very rich ore in the lower levels, which now reach a depth of 800 feet. Their 10-stamp mill is in successful operation.

The Platt, located a short distance south of the Soulsby, has been idle for a number of years. Work was resumed during the past year and the hoisting works repaired.

The Johnson and Bradbury, Independent, Churchill, Gilson, and Whitto mines, located in this vicinity, are closed.

Summerville district.—The Dead Horse quartz mine, located about one-half mile southeast of the village of Summerville, is in active operation. The claim is 1,500 feet by 600. The ore is said to be of quite high grade and is being worked at custom mills.

The Seminole quartz mine, located a short distance south of the Dead Horse mine, is a claim 1,500 feet along the lode by 600 feet in width. In the development of this mine a shaft has been sunk to a depth of 70 feet. The vein is shown lying between well-defined walls of slate, with dip of about 70° to the east; average width of vein 3 feet. The ore is honeycomb quartz, partially decomposed, and said to give a good yield in free gold. A tunnel is in course of construction which will strike the line of the main shaft at a distance of 200 feet, 80 feet of which is now completed.

The Buchanan is the only quartz mine in this vicinity in active operation; the main shaft now reaches a depth of about 400 feet. It is reported that the company have opened up a very rich chute of ore.

The old Hoyle and Daegner is a promising mine at Sugar Pine. The ore shows free gold and contains a heavy percentage of high-grade sulphurets. Last spring Mr. Teeters cleaned out the old workings and opened up the ledge. He was fortunate enough to strike a 10-inch vein of quartz, of which the above described is, he says, a fair average sample. The ledge between the walls is about 5 feet in width, but much of it is horse matter. There is a tunnel 200 feet in length on the vein, which makes the mine very convenient. There is plenty of cheaply utilized water-power close at hand and any quantity of fuel all around to be had for the cutting.

Placer-mining is still on the wane. A few persons are working in the old placer diggings, and those meet with indifferent success. The Chinese have worked some portions of the channels of the Stanislaus and Tuolumne Rivers during the past season and are reported to have made fair wages. This production was probably equal to the yield of 1883.

Near Reynolds' Ferry, on the Stanislaus River, a company is engage in constructing a tunnel through a narrow neck of a low ridge not ex ceeding 1,000 feet in length. The river here forms a horseshoe som 2 miles round It is proposed to turn the entire water of the rive through this tunnel during the summer season. This will drain th river-bed the entire distance of at least 2 miles, and then the mine ca be worked to advantage.

YUBA COUNTY.

R. L. Dunn, of Auburn, writes of this county:

Mining is of little importance, the annual yield having been rapidl diminishing since the large hydraulic mines were closed by injunctio of the courts. Most of the mining is now confined to Chinese, who wor over the old tailings of the early placer mining.

At *Smartsville* no work has been done during the year, the gravel not being rich enough to be worked by drifting.

At *Brownsville* the mines have all been enjoined and shut dow Several rich claims, very easily worked, have become worthless. A this point the annual production has been lessened by $40,000, and 5 men and their families are deprived of their usual means of support.

The Beehive quartz mine has not been worked during 1884.

At *Strawberry Valley* and the North Fork of the Yuba River an Slate Creek some mining has been done by Chinese, who have take out in the aggregate between $10,000 and $15,000, as near as can b ascertained.

Bullard's Bar and *Oregon City* are practically abandoned, the enti yield for both localities for 1884 not exceeding $20,000.

At *Camptonville* the Weed's Point mine was hydraulicked, paying s usual and employing 6 men. It has been enjoined and will not be ope ated in 1885.

The Willow Creek tailing claim was not worked during the year.

A number of small companies and about 30 Chinese have been wor ing small claims and making fair wages.

The total production of this district, Chinese included, for 1884, about $25,000.

Brown's Valley and *Hansonville* make no returns, the quartz mines n having been worked.

At *Wheatland*, the center of the agricultural portion of the coun one new discovery has been reported. In sinking a well some ri placer dirt was found, several pans of which yielded enough gold to p for sinking the well. From these indications it is supposed that a lar body of auriferous gravel will be found which will pay for working.

of Mr. A. M. Lawver of the bullion production in California during the year 1884, classified by counties.

Counties.	Gold.	Silver.	Total.
	$1, 500		$1, 500
	2, 006, 769	$1, 530	2, 008, 299
	676, 883		676, 883
	472, 055	256	472, 311
	1, 530		1, 530
	99, 980	10	99, 990
	577, 716	16, 320	594, 036
	52, 460	9	52, 469
	114, 192		114, 192
	79, 800	140, 231	220, 031
	91, 632		91, 632
	119, 060	341	119, 401
les	60, 000		60, 000
	185, 247	146	185, 393
	7, 000		7, 000
	70, 000		70, 000
	922, 071	287, 655	1, 209, 726
		2, 443	2, 443
	2, 846, 225	1, 815	2, 848, 040
	877, 320	5	877, 325
	836, 249		836, 249
to	257, 683		257, 683
rdino	40, 000	3, 706, 204	3, 746, 204
	61, 500		61, 500
	314, 822	27, 657	342, 479
	1, 177, 349	145	1, 177, 494
	469, 631		469, 631
	43, 050		43, 050
	529, 150	334	529, 484
	319, 360		319, 360
	70, 000		70, 000
	216, 773		216, 773
al	13, 597, 007	4, 185, 101	17, 782, 108

CHAPTER IV.

COLORADO.

From the most reliable information which I have been able t consisting of reports from mine-owners, statements furnished l ers and ore-buyers, express and railroad shipments, and othe sources I have estimated the yield of the mines of Colorad the year to have been Gold, $4,300,000; silver, $16,000,000; to 300,000. This shows an increase in the production of gold, oc principally by new discoveries in Clear Creek and Gilpin Cour would indicate that the falling off in the silver yield is bein compensated by new discoveries of gold, and establishes for in the future, at least its present rank as second only to C among the gold producers of the United States.

The gold belts of this State are said to be of large extent, a lode and placer claims exhibit great richness. These deposit lie on either side of the continental divide and in the spurs a along its course. Beginning in Rio Grande County, they follo cific slope through Gunnison, Pitkin, Eagle, and Summit while to the east, in Boulder, Gilpin, Clear Creek, Park, and L into Chaffee County, small veins present themselves. Indeed not a county in the State in which mineral deposits have be where gold does not exist; but as the deposits of silver and l been so much larger and more accessible, mining has been p confined to the latter metals and less attention has been g thorough exploration of the gold field.

That the production of silver fell off considerably during year, not only in the value of the product but also in the qua duced, is evident from the reports of the shipments by the of Lake County. I have estimated the reduction to have b $1,000,000 in value.

Mr. Valentine reports the value of the ores and base bullio from Colorado during the year to have been $12,780,000, $17,533,864 in 1883, and the total value of Colorado's produc ing, of course, the value of lead, at $20,233,749, against $24,3 1883.

The ore shipments from the Leadville smelters fell off from ounces of silver in 1883 to 1,358,047 ounces in 1884, while th shipments increased from 5,313,638 ounecs of silver in 1883 to ounces in 1884. These facts indicate a large decline in the s duction.

The "Leadville Herald" estimates the mineral output of the 1884 to have been $20,750,000. The "Denver Tribune" makes same estimate. The reasons for this reduced yield of silver a ent. In the first place, the mining season was much shorter than usual, owing to the unusual heavy falls of snow, followed

wash-outs, which closed railroad communication with many of
e producing mines for several months, rendering the shipment
r reduction impracticable. But the main cause of the decline in
nercial value as well as of the actual product has been the de-
rice of silver and lead. Many properties withheld their prod-
the market hoping for a rise in prices, while in some cases the
value of these metals has rendered the working of large bodies
rade silver-lead ores unprofitable.
ost notable shrinkage has been in Lake County. This to some
vas compensated by a large increase in the production of the
f Gilpin and Clear Creek, Park, Pitkin, San Juan, and San
Counties.
the whole, although there has been a reduction of about $1,000,000
alue of the precious metals produced in the State, the past year
1 one of the most successful in its history. The ores treated
en well up to the average of previous years. New beds of ores
en opened up and the mining area considerably extended. The
; and milling facilities have also been increased and new and
nomical processes devised for the successful treatment of low
id refractory ore.
e estimated the production of the mines in the counties of the
have been as follows:

Counties.	Gold.	Silver.	Total.
.....	$350,000	$130,000	$480,000
.....	80,000	190,000	270,000
.....	600,000	1,700,000	2,300,000
.....	350,000	240,000	590,000
.....	1,500	70,000	71,500
.....	30,000	200,000	230,000
.....	1,950,000	360,000	2,310,000
.....	60,000	500,000	560,000
.....	2,500	200,000	202,500
.....	500,000	9,400,000	9,900,000
.....	500	6,000	6,500
.....	10,500	740,000	750,500
.....	60,000	250,000	310,000
.....	1,000	600,000	601,000
.....	130,000	14,000	144,000
.....	13,000	.....	13,000
.....	1,000	100,000	101,000
.....	40,000	600,000	640,000
.....	100,000	400,000	500,000
.....	20,000	300,000	320,000
.....	4,300,000	16,000,000	20,300,000

retofore, Mr. Herman Silver, in charge of the Denver mint, has
the necessary information and compiled the detailed review
ines of this State, which is substantially as follows:

BOULDER COUNTY.

has been a marked improvement in mining operations in this
luring the year and a consequent increase of production. Con-
e dead work has been done on both old and new properties, but
n has closed many of the producing mines. The large produc-
e past, where not entirely closed, have been undergoing a course
opment and exploitation, thus placing them in better order for
orking.
er County is one of the best and by all odds the pleasantest
o mine in the State. Her veins are strong, true fissures, carry-

ing both gold and silver of a grade running from concentrating ore to the highest figures that have been paid by smelters in this State; the veins varying in width from the traditional "knife-blade seam" to the 250-foot width of the great Fourth of July lode. Again, the majority of the camps are located below an altitude of 8,000 feet, and all are within 20 miles of the city of Boulder, thus affording ease of access. The mountains are, as a rule, not precipitous, and good wagon roads traverse the entire mountain half of the county in all directions, while a line of railroad running west from the city of Boulder 13 miles affords an outlet for ores at a reasonable tariff, and lays coal down at the doors of several mills, mines, and hamlets, thus affording a cheaper fuel than wood, even though the hill-sides are well timbered. The well-known productiveness of the Boulder Valley supplies the mining population with the necessaries of life at a reasonable cost.

During the past few years, and especially in 1884, mining has passed into the hands of individuals. One advantage of this change has been that a great many lodes have been located by miners, who, upon the withdrawal of outside capital, began to overhaul the old dump-piles, shafts, and other workings which have been allowed to lapse to the Government through the operation of the assessment law, and to-day a large number of mines are being worked by from 2 to 5 men, who own them and are making them pay.

This county, as well as the other portions of the State, has been greatly aided by the gradually improved scale of prices offered by the smelters and the improvement in concentrating machinery. A number of the mines have their own concentrating mills, and there are four custom concentrators in the county, with another nearly completed, ranging in capacity from 10 to 25 tons per day, thus creating a market for thousands of tons of crude ore annually which until recent date has been entirely unprofitable.

A great deal of work is done by leasing, which is gradually gaining favor, and a number of mines which when operated by companies were a source of outlay are now paying the lessees. During the past year a comparatively unknown district, lying between Four-mile Creek and North Boulder, has come into prominence. The veins are large, strong fissures, running from 3 to 15 feet in width, carrying tellurium and producing a large amount of ore averaging about $50 per ton, while the sorted material which is shipped to the smelter will go much higher.

Two cross-cut tunnels are being run to prospect a number of mines at a greater depth than has yet been attained in this county. The Corning tunnel, which has penetrated Gold Hill in the neighborhood of 1,400 feet, has opened at least one vein, which is producing free-milling ore enough to keep 15 stamps constantly running. Meanwhile the main tunnel is being pushed forward to intersect the large group of veins lying directly ahead. This enterprise is in the hands of Denver capitalists, who are operating under lease.

The Dirigo tunnel, now 1,100 feet under cover, is being worked by 5 men. The prospects are good, as a large number of lodes will be intersected at a depth ranging down to 1,500 feet. Among them is the Hoosier lode, which, at the angle the tunnel is being driven, will take 300 feet to cross. This property includes twelve patented claims and ten locations.

Central district, which embraces the country adjacent to and north of Balarat and Jamestown, has made but little advancement in mining, more especially in regard to its lead deposits than of the veins carrying

tellurium and free gold. The latter class have advanced at about their usual rate, which generally accords with the ready money the mine possesses. The mills, with which this district is well supplied, have been mostly idle, and the tendency is to turn them into concentrators, which it is hoped will produce more active work and a greater output.

At Balarat the Smuggler mine still continues to produce the sylvanite ore for which it is so justly celebrated. Very little new developments have been made, the time having been mostly spent in perfecting old work and extracting ore. One shaft, used as the working shaft, is about 400 feet deep, from which at intervals of every 50 feet levels are run at right angles. There is no regularity regarding the length of these above the 300 foot level, at which point the vein, which at a depth of 100 feet was lost, was found again. Two hundred and fifty feet northwest of the working shaft is what is known as the air shaft, with a depth of 300 feet. Above the 100-foot level the ore has been almost entirely extracted. The workings are now on or below 300 feet, the lowest being at the 400-foot level, where the vein continues as above, with a width of about 5 feet. With the exception of about 8 inches of the sylvanite ore, the vein matter is of a nature to be easily concentrated, averaging in value about $40 per ton. The total development work on the Smuggler mine is about 4,000 feet. The total production since its discovery is something over $400,000.

The Saint Julian, running parallel with the Smuggler, has remained idle during the year, with the exception of the annual assessment work Although the shaft is but 90 feet in depth, it shows a well-defined vein, carrying ore similar to that found in the Smuggler.

There are many claims in this vicinity that, were they located in other portions of the State, would be considered excellent, the indications being such that the owners would feel warranted in prosecuting further development In the vicinity of Springdale considerable work has been done and quite a number of last year's claims have shipped ore, the character being tellurium.

Among the most prominent mines and claims here are the Montezuma, Ocean Wave, Big Blossom, Ellen, Rip Van Dam, Earl, Rambler, Standard, J. Alden, Victor, Grand Central, King William, and Badger. All these properties have produced more or less, and while some are well developed others are but claims.

On the Montezuma the owners have commenced developing by drifts, one having been driven 50 feet, another but 20. This small amount of work has disclosed a 2-foot vein, in which is a streak of sylvanite 6 inches in width.

Considerable prospecting has been done on the Ocean Wave, one adit of 70 feet having been run; but only the small amount of ore extracted in the course of development was shipped.

On the Big Blossom mostly surface work was performed, the greatest depth gained being 80 feet. Sufficient work has been done, however, to disclose a good vein of ore that will pay to work. Six men have been constantly at work during the year, and the owner has cleared considerable thereby.

The Ellen is developed by three shafts, the greatest depth gained being 90 feet. It also possesses an aggregate of 80 feet in levels and drifts. The width of the pay streak will average 6 inches. On each side of the pay streak is from 20 to 24 inches of good concentrating ore.

The Rip Van Dam, which is on the same vein as the Ellen, possesses no advantage in width or value, but is more thoroughly explored. A drift

of 120 feet has been run on the vein to connect various shafts sunk different points. There is in all probably 300 feet of development this claim. The death of the owner stopped exploration work in t middle of summer.

The King William and Badger, owned by the same party and bei on the same vein, are worked in unison. Two shafts have been sur respectively 100 and 122 feet, with levels aggregating 300 feet, all a depth of 100 feet from the surface. No stoping has been done on t proprty. A good shaft-house, ore-house, whim house, and blacksmi shop, together with several open cuts from 5 to 15 feet in depth, co prise the developments.

In addition to the amount shipped there remain 300 tons of low-gra ore on the dump, worth from $26 to $60 per ton. These mines are bad shape, being full of water, but negotiations are now pending which it is hoped this property will soon be put in working shape.

The Grand Central, near the Big Blossom, has been idle most of t year. The ore mined in 1882 still remains on the dump. What is s of the Grand Central would apply to the Earl, except that it is not well developed. But little work was done during 1884, and the proper like many others, is but a promise for the future.

On the Standard the owner has been working single-handed, devel ing the vein and shipping only enough ore to pay the necessary expens The developments now consist of three adits, one 190 feet, one 105 fe and another 90 feet long, a shaft 25 feet deep, in addition to various op cuts.

Of the vein and the character of its ore I am unable to state, l from information received I believe the ore to be rich.

The J. Alden is in good condition for future working. A cross-c tunnel cuts the vein at a distance of 230 feet, disclosing a 4-foot ve the pay streak of which will average 8 inches in width and consid able in value. The balance of the crevice matter is of a character eas concentrated. At the end of this tunnel a drift is run 120 feet. winze in this drift is made to connect with drifts some 30 feet abo These drifts run 40 feet each way from a shaft 60 feet deep. The wo ings on this property show favorable indications of mineral.

The Victor, on the same vein and owned by the same parties, is l little developed. The work done, however, is sufficient to prove the istence or continuation of the vein, and with the same amount of devel ment will be equal in production to the J. Alden.

Jamestown has once more settled down to earnest work, and a a few years' labor will, it is hoped, be possessed of a number of p ducing mines.

The properties on Golden Age Mountain and down Central Gu still continue to aid the production of Boulder County with their limi donations, but the galena deposits which caused that unfortunate bo of 1882 and 1883 have yet to reward their owners for the money invest One engaged in mining writes me that "the unwarranted boom of t spring of 1883 has had a very depressing effect on the camp, by usi up the little money possessed by the resident miners and mine-own in 'wild cat' speculations, and by retarding the investment of outs capital by breaking down the confidence of capitalists in the merits the camp which might previously have existed. Another drawback the camp has been a great lack of mills, concentrators, or some m of reducing the ores. New processes have started up from time time, but, after months of unsuccessful experimenting, have universa retired as lamentable failures. We are soon to experience anot

attack of 'new Process' but what the result may be remains to be seen. There are thousands of tons of good concentrating ore in the camp, and many of the now dormant mines would soon become good producers by the erection of concentration works in this camp."

The Colfax mine, in Central Gulch, has not been worked during the year, and the same might be said of the Warrior, Princess, Encounter, Morning Glory, Buckey, Nolan's, May Queen, Cheap John, in fact most of the mines of this immediate locality.

On the Pet considerable prospecting has been done in endeavoring to find the pay pocket, which on the surface was remarkably rich in free gold. So far no further pay has been found, but the owner, J. E. Du Bois, informs me that with the opening of spring work will again begin and be vigorously prosecuted.

The Governor's group of mines are again being worked, and with flattering prospects. These mines were sold in June last to H. L. Haines, of Philadelphia, since which time 6 men have been constantly employed in taking out ore and drifting. The development now consists of eight shafts averaging 50 feet in depth, a tunnel 600 feet in length, and probably 500 feet of drifts. The ores are refractory, averaging $40 per ton in silver. The mill is used for experimenting in treating this ore.

The Bueno gold mine, situated on the divide between Big and Little Jim Creeks, has been extensively worked by the proprietor, and the mine is now in condition for a large production. The ore is a telluride, showing sylvanite, petzite, and calaverite. The development during the year consisted in sinking 100 feet lower on the main shaft and running another cross-cut tunnel 408 feet, which cuts the vein at a depth of 300 feet. The winter's work will consist in running levels and raising winzes to connect with the upper levels. Only enough ore has been extracted to pay the cost of developing, and I am informed that the ore now in sight or blocked is sufficient to once more give the Bueno its old reputation of being one of the best producers in Boulder County.

The Buenos Ayres, near the Bueno, has been worked by lessees with some success, considerable good-looking ore having been extracted, the character of which was mainly galena, with iron and copper pyrites and fluor-spar as gangue, the value ranging anywhere from $15 to $500 per ton. This is a large fissure vein, developed by a shaft 120 feet deep and about 75 feet of drifts.

The Baltimore Belle, one of the steady producers of the past, has, on account of the health of its former owner, been closed during the entire year.

Beyond the necessary annual assessments the Nelth group and Gordon group, two extensive properties, have been idle. The Stanislaus lode, on main James Creek, is a large, well-defined vein, carrying galena ore with iron and copper pyrites, that runs well in both gold and silver. A small amount of work was performed and some ore shipped, netting the owners considerable over expenses.

The Song Bird group of mines, composed of the Song Bird, Silver Cord, Northern Light, and North Side, four continguous and overlapping claims, embrace about 12 acres, on which the owners have expended considerable money and labor in developing and placing these properties in position for future production. On these veins are numerous shafts, adits, open cuts, and cross-cut tunnels; of the latter three have been driven during the year, No. 1 being 175 feet, No. 2, 300 feet, and No. 3, 180 feet.

These developments disclose a vein 30 or 40 feet wide, the pay streak

averaging 2 feet, being a mixture of galena and sulphurets that give an average assay of $125 per ton.

In the Mermaid, on Mermaid Hill, the tunnel, which had been driven in 60 feet, has been continued 53 feet, and 10 feet additional sunk on the shaft. The vein, which is 15 feet between walls, possesses a very narrow pay streak of tellurium.

Among the prominent prospects in this locality mention should be made of the Gold King, S. B., Blue Jay, Gus Barnes, Lead Silver, and Saint Louis, on Blue Jay Hill.

On Little Jim Creek none of the many prospects mentioned in my report of last year have to date become producing mines. The Semiramis, Veto, Invincible, and Orlando, all of good promise, have yet to make their first shipments. On the Volens and Brunswick some work has been done that will no doubt cause these to come to the front in 1885.

Gold Hill district has done much to swell the output of Boulder County. The most prominent producers are the Slide and American, formerly the property of the American Consol Mining Company; but early in the spring of 1884 it changed owners and a large force of men were employed in extracting the ore and exploration, since which time shipments have not ceased and the ore now in sight will warrant a continuation during 1885. The Slide and American are worked in unison. The output is now through the Corning tunnel, 700 feet in length, and which cuts the vein of the Slide mine at a depth of 520 feet. The old shaft, which is nearly 700 feet deep, is used as an air-shaft. There are about 2,500 feet of levels and 375 feet in winzes, to which each day more is being added. The upper workings (those above the 400-foot level) are nearly worked out, but from that depth to the 700-foot level the ore is mostly in place. The tellurium found in the upper workings is still found on the lower level and is equally as rich and plentiful. The surface improvements consist of all the appliances requisite for successful mining, and the buildings, machinery, &c., are of the very best. The Bella remains in about the same condition as at this time last year. In the spring preparations were made for extensive operations, but, owing to the illness of the owner, work was suspended and the mine has since remained idle. For the same reason the Van Buren has been idle. A little work was performed, but not sufficient to make the output amount to anything.

The Black Cloud, one of the producers of the past, has also remained idle. This is a well-developed property, having over 1,800 feet in shafts, levels, and winzes. The ore, which will average over $50 per ton, requires concentration.

The Vulcan has been receiving some attention during the year. A new shaft has been sunk and drifts extended. But a small amount of ore was stoped, only sufficient to pay the expenses of developing. This is a big vein, carrying free, milling gold ore that averages $70 per ton.

The Melvina is the property of the Scottish Colorado Mining Company. The vein, which will average 5 feet in thickness, is mostly galena, in which is a pay streak of 8 inches width of iron and copper pyrites that runs well in gold. This property is developed by a shaft 500 feet deep. At intervals of about 90 feet are drifts each way on the vein, the aggregate of which amounts to 1,440 feet.

In *Crisman District* the most prominent mines are the Yellow Pine, Gray Copper, Vancluse, Mitchner, Duroc, and Pine. This group has paid all the expenses of development, the construction of wagon roads, erection of buildings, &c. These mines were located in 1873, since which

time three of them have made good returns for the money expended in their development. These are the three first mentioned; the others, the Mitchner, Duroc, and Pine, are now sufficiently developed to produce ore, although to date their product was small. On the Yellow Pine, tunnel No. 6, now in 375 feet, is being driven by night and day shifts; winzes are also being raised to connect with the level above. The ore will average over 200 ounces silver per ton and does not require sorting.

The Gray Copper is in about the same condition as last year in relation to development, but considerable ore has been shipped. The Vancluse is developed by four drifts or levels run on the vein. Level No. 1 is 80 feet; this is near the apex of the mountain; 75 feet below (perpendicularly) is level No. 2, which is 300 feet in length; these two levels are connected by a winze. Level No. 3 is 325 feet long, two winzes connecting this with level No. 2; and No. 4, 350 feet long, is connected with No. 3 by two winzes. Throughout these workings the vein is found, the average width of which is 3 feet, the contents being a gray copper and sulphurets that contain an average of 200 ounces of silver per ton. This group of claims produces silver, but no gold.

About 300 yards distant from the Yellow Pine is the News Enterprise, the pay streak of which is tellurium carrying from 50 to 100 ounces of gold per ton. The News Enterprise has been idle during the year.

The Magnolia has been dull. If any of the mines have produced, the amounts have been small and more to determine the value of the ore in places than as a source of income.

The Senator Hill and Ophir, two adjoining claims, on which there are about 500 feet of development, and whose vein contains a rich streak of sylvanite of an average width of 5 inches, have been idle. The Rebecca, another promising prospect, also remains idle. The Little Maud, Telephone, and Magnolia, three claims which have ranked as producers, have been allowed to remain unproductive.

At *Caribou* mining is at a standstill. In the Caribou mine water has been allowed to rise to the first level, and old miners estimate that to put this property in first-class condition it will cost more than the profits of at least two years' successful working of the mine. The Poorman, near Caribou, has added much to the production of this county during 1884. The mine has been a regular producer, and developments indicate it will so remain during 1885. The vein is 3 feet wide; the pay streak averages 8 inches, which will run about 200 ounces of silver to the ton. The Poorman is developed by a shaft 600 feet deep, from which at about every 75 feet are run levels, the aggregate of which is nearly 1,000 feet.

In *Sugar Loaf district* the placers have been worked quite extensively and with good results. The Phillips and Wood placer is being operated by Chinamen, who have made 400 feet of open cuts and built a bed-rock flume. Extensive preparations are being made by the lessees to work the William Germain placer during the coming year.

The Phillips placer, above the Phillips and Wood, is also worked by Chinamen. This property has 800 feet of open cuts and bed-rock flumes.

On the G. P. Wood placer, worked by the owner, are about 850 feet of bed-rock flumes. The gravel has yielded well during the season. Some improvements are being made on this property, and it is expected during the coming season that it will be mined on a large scale.

Lode mining in the vicinity of Sugar Loaf has been dull during the year. The owners have done necessary assessment work, but few

have done more than that. Among the properties recently leased and on which preparations are being made for work are the Frigeburgh, Franklin, Emerson, Denver, Sugar Loaf, Colorado, and Washburn.

CHAFFEE COUNTY.

Although the tonnage and output of this county have almost equaled that of 1883, yet, on account of the shrinkage in values of lead and silver, the amount in dollars is far below what it was in that year. Much more was expected from this county on account of the extensive developments made on the numerous properties, few of which have made any material advancement, but remain as they were—prospects. The gold production has also fallen off, but this is largely due to the shortness of the season. The truth is, veins in this section of the State require considerable development, the mineral in the veins not solidifying within 200 or 300 feet of the surface. To properly develop veins of this character considerable capital is needed, without which a much longer time is required, as the owners work in small force and but a limited time.

In *Hope district*, mining is in about the same state as in 1883. With the exception of the Twin Lakes Hydraulic Gold Mining Syndicate, this industry is not very lively.

The veins here are gold-bearing, but the ore is not so rich as to cause much excitement.

During the year concentrating works were erected at *Granite*, which stimulated work on the mining properties; but whether this will result in any great amount of development and exploration in the future is difficult to say.

Some of these veins were quite productive years ago, and have considerable developments, which, as a rule, discloses veins whose pay streaks, though narrow; possess free gold.

The Yankee Blade, one of the oldest mines in the county and one that in the past was a large producer, has been put in order to receive a thorough exploration. Col. A. J. Ware recently bought this property, placed a fine hoisting plant and pump in position, cleaned the workings of water, and is now engaged in retimbering. If the ore-bodies are such as to warrant, he will then place a mill in position for treating the mineral.

The B. B. mine, owned by Ball Brothers, has shipped some ore being of a fine gold character and averaging $150 per ton. Although the mineral is rather pockety, the pay streak will average about 9 inches so far as developed.

The Jennett has shipped but a small amount of ore, and in developments nothing has been done. These same words would apply to numerous claims in this district, but should silver remain at its present prices during 1885 many of the claims will receive attention.

The Twin Lakes Hydraulic Gold Mining Syndicate of London, whose property consists of placers along Cache, Clear, and Young American Creeks, is under the able management of T. F. Van Wagener. This company own in all about 7,000 acres of placer ground, and through the season on an average of 40 men have been employed in washing out the precious metals and improving the property. The grounds on Cache Creek are probably the best developed, having been worked for the past fifteen years by the Gaff Mining Company.

About 2 miles of this ground have been opened in the center of the channel, a total area of about 50 acres. Not only on the Cache Creek placers, but on the others also, the auriferous pay ground has a thick-

rom 12 to 100 feet. During 1883 a ditch was made to convey
the working of these deposits, the ditch being 4½ miles long;
ət fluming, and 600 feet in a tunnel driven through one of the
ıs.
tch carries 2,500 inches of water, the entire flow of which is
ırough hydraulic pipes. The following relating to these placers
from the Chaffee County Times:
ast heading of the great tunnel, 2,100 feet in length, connecting
eek and Cache Creek, was broken through and communica-
blished between the two creeks. At the southern approach
nnel about 19,000 feet of flume and 5,000 feet of ditch bring
: to the tunnel level, which is 650 feet above the creek level.
›bject of this is to furnish water from Clear Creek to work
ısive placers belonging to the company in Cache Creek. The
ı been in progress now for something over six months, and
ıpleted will cost in the neighborhood of $50,000. The work
nenced simultaneously from both ends, and afterwards a shaft
from the apex of the hill to the tunnel level, a distance of 211
headings started each way from the shaft. With four head-
ıtantly pushed, the work progressed very rapidly until about
ı ago, when the increased cost of working the two inside head-
ıced a stoppage in them, and two shifts were put on the north

unnel is almost 6 feet in height and 4 feet in width. About
of the work is solid granite and needs no timbering; the re-
being gravel and wash, is well timbered.
Cache Creek placers comprise nearly 2,000 acres of ground, a
vhich has been worked for over fifteen years. Owing to the
›f water and imperfect facilities for handling the dirt, but a
›f the ground has been washed. It is the intention of the com-
rect suitable hydraulic machinery, and employ a force of 40 men
›n. From a three weeks' run at the latter end of last season,
ıenditure of $750 for labor, the company cleaned up $3,300.
ıharacter of the ground to be worked is loose, soft, and remarka-
rom bowlders. The lay of the ground is peculiarly adapted to
ggings, and shows glacial action in the formation of the rich

t a mile above the English company's ground is the Lost Cañon
hich has been leased and is being actively worked.
ata district, though sharing in the general depression pervading
ıatters in this section, has made substantial progress during
season. Perhaps one of the most important discoveries is the
ı new find in the Left Hand Fork.
gh but little more than surface work has been done, a late ship-
0 sacks of ore to Leadville yielded an average of $150 to the
ə Barconta group shows the same heavy body of mineral as
e. A new tunnel has been started on the vein 280 feet further
ı hill, which is just coming into solid formation, and will catch
ore-body shown in the upper workings in a much more accessi-
. It is reported that an English company is negotiating for an
n this group. Should the negotiation be consummated it is
ıely that a large force of men will be put on the work and a
rected.
Sands-Pelton tunnel, now in 500 feet, is in a large body of white
posed to be the lode for which they have been driving."
wood district has done little or nothing to swell the output of

the county. Some work in the way of development has been done, bu I can find no trace of shipments beyond an occasional mill-run. During the spring of 1884 there was considerable excitement over the discovery of carbonates near the town of Salida.

More thorough exploration and developments are needed to demonstrate the verification of this class of mineral. The property most prominent and most developed is the Sedalia, of which the Denver Tribune says:

"This property, consisting of the Sedalia claim and its extension, the Hidden Treasure claim, begins at the base of the first of the foot-hills on the east bank of the Arkansas River, about 4 miles above Salida, and holds a northeasterly direction across the hills for its length of 3,000 feet. The discovery shaft is at the summit of the first hill, and the tunnel workings are 200 feet lower down the hill on the west side, at a point very nearly in the center of the first claim. At this point the outcrop stands boldly out of the ground to a height of about 20 feet, with thickness nearly as great, and again appearing in smaller detached croppings for a total space of nearly 100 feet in width. The general supposition is that this is one immense fissure vein, although no defined walls appear in any of the workings.

"The Sedalia was located in 1881. Two assessments had been done upon the discovery shaft on the summit of the hill up to November, 1883, when work was immediately begun on the shaft until a depth of 50 feet was obtained and a drift from its bottom pushed out 22 feet. Then a tunnel was started on the east side of the high outcrop above mentioned, and continued along the vein in the direction of the shaft for 75 feet. At this point it turns abruptly to the left, as a cross-cut, and has been extended about 35 feet. This development opened the ore-body which has given rise to the present excitement, and occurred just previous to the expiration of the bond, on the 1st day of May. Not having the money to take up the bond, an extension was secured for another three months, with deed in escrow placed in bank by the original owners. The news of the discovery was thereupon given publicity.

"Interest of course centers upon one little spot in this cross-cut from the line of the tunnel. For the first 20 feet the ore will pay to ship unassorted, for its copper, and then occur spaces which require sorting; then good ore again, thus alternating for the first 75 feet. The first 15 feet in the cross-cut, looked at as a breast, will yield, unassorted, say, 20 to 25 per cent. copper. The next 10 feet are apparently lean, exhibiting syenite and wernerite, and then disclosing 10 feet of a mixture of hard and soft carbonate of iron, chunks galena, copper carbonates, talc, sulphides, oxides, &c.

"Many surprises have fallen to the lot of the Colorado miner, but the greatest of these will be to be compelled to seek for lead carbonates beneath a copper-stained quartz outcrop along a fissure-vein formation. In the vicinity of the Sedalia there appears neither the porphyry nor lime formation which is characteristic of Leadville, and the discovery alluded to, it should be remembered, was made after following in upon a copper vein a distance of nearly 100 feet, with nothing except the abrupt presentation itself to lead to the supposition that carbonates and galena would reward the work of exploitation. But both porphyry and lime identical with that of Leadville are said to occur a little further back from the river."

Mr. E. R. Emerson reports the Sedalia mine as looking fine. The winze has been sunk 100 feet and drifts run north and south, all in ore. The south drift is in 70 feet, showing black oxide of copper and pyrite

running 38 to 55 per cent. copper and 9 to 10 ounces in silver. A test lot has been shipped to New York, where an offer of $1.70 a unit for the copper can be obtained, owing to the fact that the copper is absolutely pure, no arsenic, antimony, or other foreign impurity being present.

The Buena Vista Mining and Reduction Company's mill shipped a gold retort weighing 7½ ounces, valued at $150, to the assay office at Saint Louis, the result of a thirty-six hours' run on Dundena ore. A large pocket of very fine ore has been encountered in this mine, which promises to turn out rich. The body of ore, so far as uncovered, is 4 feet wide, 60 feet long, and has been sunk on to a depth of over 50 feet. The average value of ore, so far as tested, is about $80 a ton. The 10-stamp mill ordered by this company will be erected at the Friendship mine, controlled by this company. The output of the two mills, when all the facilities for getting out ore are complete, will not be far from $400 a day. An increased interest in Gold Hill properties has been experienced within the past three weeks.

Up the *North Cottonwood* a few claims have received some development in addition to the annual assessment work, and on two or three mines a force will be employed through this winter. The Eagle Bird and Fannie Wyatt have been idle.

On the Queen Bee work is now being pushed. The vein will average 9 feet wide, between walls possessing a pay streak 3 feet on an average. The ore is said to be a carbonate of lead that assays as high as 300 ounces silver per ton. The mode of developing is drifting on the vein; the drift is about 180 feet long. There is considerable ore in the stopes, which may be removed with the opening of spring. The Hidden Treasure Mining and Milling Company are employing a force of 7 men during this winter in pushing a cross-cut tunnel, which is now 115 feet long, with about 40 feet yet to go to cut the vein, which measures 8 feet across and whose pay streak is of a high grade of ore.

The Uncle Sam and Ketchum are also being worked this winter. The character of development on each is running cross-cuts to tap the vein. Some very high-grade ore has been taken from the surface workings of these claims, and with sufficient development will become producing mines.

The Madeline, in Texas Creek, has been worked with good results during the summer. Two men were constantly employed and the ore extracted shipped. The disclosures made this year are such that the owners will employ a large force as soon as the season opens.

The White Quail, near the Madeline, is but a prospect, on which half a dozen 10-foot holes have been made; but the character of the mineral and width of vein have proved of sufficient magnitude to justify the owner in employing a force of men to push developments.

The Jimmy Mack has received only assessment work, but in working this a new vein was struck about 20 feet south of the old tunnel. This vein shows 8 inches of pay and about 3 feet of mineral gangue. Shipment from this claim last year ran over 100 ounces per ton. The Gaston is making some progress, although the developments do not amount to much as yet. The character of the ore is gray copper, that carries about 175 ounces of silver per ton. The vein is 4 feet between walls and possesses a pay streak about 18 inches wide. The deepest workings are but 80 feet.

The Gladstone is the only important mine on the North Cottonwood. The vein is between 6 and 7 feet wide, throughout which the mineral is scattered. Considerable was extracted and shipped in 1883, but, owing

to the trouble experienced from water, the company was compelle abandon the workings and started a tunnel at the bottom of the mc ain. A distance of about 1,600 feet was required before reaching vein. About 1,200 feet have already been run and the Ingersoll is kept constantly at work. The vein will be cut at a depth of 1 feet. When this is done it is thought that the Gladstone will agai one of the big producers of the county.

The Mount Carmel, a 30-foot vein, has not been worked beyond as ment. Over 300 feet of development have been done on this pro and the mineral will average $50 per ton.

On *South Cottonwood* the Eldorado Company owns some we veloped claims, each of which has a well-defined vein; but assess work only was done. The Guthrie, Little Cuba, and Dandy have idle. The Cornucopia Mining Company was also idle until late i season, when a contract was let to run a cross-cut from the Bur lode to the Cornucopia, a distance of 500 feet. This will be pushed all possible speed, and by the opening of spring the other claims o company will receive due notice in the shape of development.

The Burrows is cut by a cross-cut tunnel at a depth of 300 feet; l are being run on this, and the property by the coming season wi in shape to ship ore.

The Sharp and Fleetwood tunnel, which is being run to cut the belonging to the company, is being worked, but the progress ma slow. Another year will be required to finish it.

Chalk Creek district contains many well-developed mines and a many fine prospects.

The Mary Murphy Mining Company is reported to have shippe tons of bullion to Denver, and the Richmond Mining and Smelting pany 18 tons.

Ore shipments are reported as follows:

Name of mine.	Tons.	Va
Mary Murphy	2,635	$92.
Treesa C	236	14,
Northern Boy	26	
Gold Field	42	1,
Brittenstene	10	
Rarus	24	1
Pioneer	16	1
Stanley	4	
Moultrie Mining Company	1	
Diamond Queen	15	
Odd lots	2	
Total	3,010	113

Of the ore shipped out of this district for treatment the Omah Grant works received 413 tons; Matthews & Webb, 279; the B and Colorado works, 164; and the Denver Public Sampling work tons, the balance going to Alpine, except a few small lots.

The Murphy had been extensively exploited and considerabl shipped during 1880, 1881, and 1882. The mine is in an advanced of development; four levels, 80 feet apart, have been run for several dred feet, each connected by winzes. The vein is from 5 to 15 fe width, showing no mineral barrenness in any part of the work From the lowest or fourth level a winze is now down 100 feet, contract let and being pushed for an additional 150 feet.

The development consists of the following: Original discovery

130 feet deep to level No. 2; winze from No. 2 to 3, 80 feet; three winzes from No. 3 to No. 4, each 80 feet; level No. 2, 500 feet; level No. 3, 750 feet; and level No. 4, 850 feet; a total of 2,639 feet of development now completed, in addition to a winze from level No. 4 to No. 7, a distance of 240 feet. This the contractors have just commenced. It is situated about 600 feet from the entrance to No. 4. A force of men is also running a drift half way between levels Nos. 3 and 4, from the end winze back toward the middle winze, preparatory to stoping. Forces are also employed in stoping between levels Nos. 2 and 3 and between 3 and 4. The ore-body in level No. 4 runs from 6 to 11 feet in width. At a point 40 feet below the fourth level in the winze the ore for a distance of 10 feet was assayed and exhibited a value of $40 per ton. Taking this as the value of the ore now exposed, it can be readily seen that the Murphy people have had an incentive to discover a cheap process for reducing their ore into bullion.

The Livingstone, below the Murphy, has been put in good order and a new plant of machinery placed over the new shaft. This is a well-developed property, possessing in shafts and levels about 900 feet. The ore is of the same character found in the Murphy. Considerable is in sight and the owners now intend to explore and develop. It is expected shipments will begin with the opening of the season.

The Pioneer is being worked by lessees, who have been shipping but a small amount of ore. The drift is 55 feet below the working level, and has been run a distance of 30 feet south from the shaft, showing a continuous body of good mineral. The shaft is down 70 feet below the main level and is being pushed by two shifts of men. When the shaft reaches the depth of 100 feet, drifts will be started both directions along the vein and stoping commenced. At present but one shift is employed in drifting. Assays of over 400 ounces in silver and in the neighborhood of 20 ounces in gold have recently been obtained from samples of their best ore, and a small run on a lot sent away before the rich streak was encountered gave a return of $180 per ton. They now have 13 tons of ore on the dump ready for shipment.

The Tressa C., belonging to the Richmond Company, is also in good shape. Nothing has been shipped running under $125 to the ton, while some tests made have run high in gold. Work is being actively pushed with a force of 45 men. An incline 170 feet was run, connecting with a shaft at a depth of 50 feet from the surface. The bodies of ore exposed in this property have encouraged the owners, who let a contract for 200 feet of development, as follows: Lower north drift, 50 feet; upper south drift, 50 feet; lower south drift, 50 feet; and main tunnel, 50 feet. The present levels consist of an upper south drift, 30 feet, showing a 2-foot body of gold-bearing ore; upper north drift, 35 feet; the lower north drift, 43 feet; and lower south drift, 18 feet. On the lower south drift 15 feet will cut the ore-body shown in the upper south drift. The upper drifts are at the 25-foot level and the lower drifts 50 feet below. The vein filling is gray copper, galena, and copper pyrites, the copper pyrites being similar to the rich gold-bearing ore found in the Bassick mine, at Rossita. The gray copper is found in bowlders, which are in fact a mixture of copper, silver, and antimony. When quartz appears it has a dull pink or flesh-colored appearance, which is characteristic of the best ore of the Mary Murphy.

Owing to the want of proper machinery it was late in the season before the workings were cleared of water. The development consists of a shaft over 125 feet in depth; from a point 75 feet down two levels have been run about 200 feet in all and quite rich ore has been found,

The character of the ore is a quartz that carries on an average 2 ounces of silver per ton.

The south extension of the gold field is the Red Cloud, which h a shaft 98 feet deep. Eight feet from the bottom a seam of good o was met. The mine is well situated for work and shipments will begun as soon as possible. This claim is also closed on account of su face water.

On the southern part of Chrysolite Mountain is the property of t Brittenstene Mining Company, composed of the Lily, Virginia, a Quincy. During the year the development and explorations have be on the Quincy, and now that this company is free from litigation t chances are that it will soon rank as a producer.

The Quincy is being worked by a force of 10 men, under a less Stopes have been started at the 125-foot level, which show over a fo of high-grade ore. In the bottom of the shaft, a depth of 150 feet, extremely fine body of ore has been encountered. A cross-cut tunn over 1,600 feet long is contemplated, which will cut the entire Britte stene group, besides several other valuable lodes not developed on t surface.

The following relating to the Stanley and the Rarus is taken from t Saint Elmo Mountaineer of January 3, 1885:

"The shaft had reached a depth of 70 feet, and in sinking the last feet the streak of mineral increased in width from about 1 foot to ful 2½ feet, while the apparent value of the ore has undergone quite as gre a change. Instead of the flesh-colored quartz of old, the lead now co sists of very fine white quartz, carrying a large quantity of galen small amounts of yellow copper and zinc, and selected specimens sho bits of silver glance, valued at about $85 per ton. The water is no easily kept out by means of a 'whip,' the shaft is protected by a lar and comfortable shaft-house; stable and shop are convenient, and i deed all arrangements about the property are such as to afford the be facilities for uninterrupted work. Work was begun on the cross-c under contract, and it is expected that the vein will be cut within t limits of this contract of 30 feet. Operations will be continued on t shaft. The lessees of the Rarus mine are stoping up from the low north drift. This drift runs north 20 feet from a point in the shaft feet below the end of the main working drift, and the stope shows average of 8 inches of ore that will mill about $75 per ton. A sm shipment was made to Gunnison, which was partly made up of old c lying on the dump, and the returns were 60 ounces in silver per to The lessees had about 12 tons more which they expected to ship."

Further up Pomeroy Gulch and on Mineral Ridge there are numero fine prospects and some mines. But this is a locality where snow me slowly and the roads are bad; hence the access to a market is somewh difficult; the ore must be rich to pay for shipping it.

There is plenty of ore, but the general average will not be above $ per ton. While shipments have not been made, considerable work h been done, which if continued another season at the same rate, many the prospects of to-day will be producing mines in a year.

Claims worthy of mention are the Little Bonanza, Big Bonanza, t claims of the Lone Star group, more especially the Little Casino a Big Casino, the Flora Bell, the Big Smoke, and Gladstone. On Mi eral Ridge the Kentucky and Stonewall are both idle.

Monarch district has been the locality where the greatest per cent. the output of the county originated, and while this assertion holds go for 1884, yet, owing to the closing of the Columbus mine and mill, t

output has fallen short at least 50 per cent. of what it should have been.

The Silent Friend, Wilson, Crœsus, Charm, Auretta, Colorado Chief, in fact most of the mines that in 1883 aided to swell the production of bullion in this district, are closed.

The Madonna mine, now the property of the Colorado Smelting Company of Pueblo, is still a promising property. Shipment has not ceased during the year and the ore now in the stopes is of a quantity and quality as to warrant the belief that the Madonna will continue to be one of the leading producers. Two tunnels have been driven during the year, each about 350 feet, and three others have been commenced on which work is constant. They have been shipping regularly for the past eight or nine months, during the past four months over 100 tons per day, and are now shipping from 10 to 14 car-loads daily. The ore lies near the surface and is easily mined. It consists of sand and hard carbonates, mostly in pockets in the lime. About one year ago the ore ran, without sorting, 5 to 7 ounces in silver, trace to four-tenths ounce in gold, and an average of 40 per cent. in lead. The Leadville Herald says of it:

"The Madonna mine is working a force of 65 men at present, and shipping 10 cars of ore daily to Pueblo. The new tramway from the mine, nearly 3,000 feet, to the railroad is about completed, and will be in operation within the next ten days. It is a fine piece of mechanical skill, being built at an inclination of over 45°. The loaded cars bring up the empties, the tram having a double track. Those portions likely to be obstructed by snow are shedded, and it is expected that no difficulty will be experienced in keeping the tram running uninterruptedly all winter. The output of the mine is at present limited to the ability of the Rio Grande Railroad to furnish cars. When the mine is working a full force, and the tram is completed, the output could be easily increased to 200 tons daily. The principal stope is nearly 300 feet long, 60 feet wide, and 40 feet high, and the interior of the mine shows a perfect forest of timbers. Ore is sent down from the various workings to the main tunnel level through different chutes, and thence run out to the ore platforms, where it is loaded in wagons. In a few days all this will be changed, and the product will be sent down to the lower tunnel, which is on a level with the upper end of the tram, and the army of teams and teamsters will be seen on the hill no more."

Some work has been done on the Fairplay and some ore shipped.

CLEAR CREEK COUNTY.

Notwithstanding the falling off in the price of silver, the great mines of Clear Creek County have continued to yield large quantities of this metal and active preparations have been in progress for working new claims. At Silver Plume and Silver Dale all of the mines have been at work with the accustomed activity, while the mines of Red Elephant and Silver Creek camps have continued to yield large quantities of ore. The veins of this county are thought to be true fissures, and so far have improved as depth has been attained. The Georgetown Courier gives the production of the county $1,860,936, distributed as follows:

Handled by Boston and Colorado Company	$918,000
Handled by Golden Smelting Company	284,357
Handled by Mathews & Webb	222,029
Handled by Freeland smelters	344,000
Gold purchased by banks of Georgetown and Idaho Springs	20,550

This does not include the amount which went to the Grant and Pueb smelters, the former having handled nearly a half million dollars' wor of Clear Creek's product. According to the reports of the smelters, t production of gold and silver in Clear Creek County for the year was follows:

Name of mill or smelter.	Gold.	Silver.	Total.
Barrett & Fletcher stamp mill	$5,627 00		$5,627
Ball stamp mill	6,000 00		6,000
Boston and Colorado Smelting Company	210,000 00	$652,000 00	862,000
Colorado Ore Sampling Company		71,440 00	71,440
Denver Public Sampling Company	27,123 60	400,000 00	427,123
Freeland smelter	288,678 64	60,861 79	349,540
Golden Smelting Company	7,696 68	228,145 18	235,841
Mathews & Webb	66,763 40	136,631 01	203,394
Mansfield stamp mill	6,810 00		6,810
Omaha and Grant Smelting and Refining Company	56,760 60	90,661 57	147,422
Osbourn & Munn stamp mill	854 00		854
Rocky Mountain stamp mill		89,450 00	89,450
Placer production	12,550 52		12,550
Production of base metals			300,000
Total	688,864 44	1,729,189 55	2,718,053

The shipments of ore from Georgetown during the year amount to over 7,000 tons, valued at $1,000,000, of which 357 car-loads we shipped to Denver, 206 to the Argo works, 85 to the Golden smelt 4 to Idaho, and 2 to Black Hawk.

The Public Ore Market of Georgetown handled during the ye 3,386 tons of ore, valued at $513,000.

In *Argentine district*, on Red Elephant Mountain, the mines of the R Elephant Mining Company are the best developed properties in Cle Creek County. They are being worked by lessees almost entirely, wit success both to themselves and the company. In White lode ve filling above the 450-foot level has been mostly extracted. The compan has succeeded in clearing the White Extension of water and the ol workings have disclosed large bodies of high-grade mineral. But litt is being done on the Free American, while on the Boulder Nest an White numerous lessees are working. On the second level of t Boulder Nest, Messrs. Baehr & Co. have a large body of ore that is good grade. They now have about 15 tons ready for shipment. On t third level, east of the shaft, Messrs. Thomson & Co. have started cross-cut in the hanging wall, and are following a small but rich stre of ore. These lessees have been very successful recently in worki over a stope in the lower level. In the fourth level, west of the sha Messrs. Woodruff & Barrett are running the level ahead to inters ground they have leased under the Bush-Willis workings. This grou is known to contain good pay, a large amount having been taken o above. The White lode is still vigorously and systematically work by lessees and produces the usual large amount of ore each mon On the third level, west of the Swartz shaft and in the hanging w Gordon & Co. have struck a streak of high-grade ore. Beneath Gord & Co., O'Brien & Co. are sinking a winze to connect with their dri from the adit level. In this winze they have from 8 to 10 inches of go pay. They have taken out 7 or 8 tons since they commenced to si and have the same sorted ready for shipment. This firm is also st ing the ground above the winze and taking out good pay. N beneath is the ground of Peterson & Co., who are working in seve places and have good pay in all. They have several tons ready

shipment. The ground next beneath is worked by two sets of lessees, Irwin & Co., west end, and Hanley & Mines, east end. Irwin & Co. have about 8 inches of ore in their workings and several tons out ready for shipment. Hanley & Mines are sinking a winze through their ground, and have a large streak of ore, the value of which is not known but looks well. They have 8 tons out. On the ninth level of the White lode, J. B. Vansickle, who recently purchased the Buchanan lease, is taking out good pay. His last shipment, being 4 tons, the result of nine days' work, brought, first class, 230 ounces, second class about 100 ounces. He is working his ground in two or three different places and has good pay at all points. East of Vansickle, Messrs. Pick & Co. are driving a drift that shows well in the quality of quartz and indicates mineral in the White lode.

The Free American Extension, which embraces the 1,500 feet east of the Free American, is a well-developed vein.

Little Giant lode, on Red Elephant Mountain, is improving as development work progresses. In running a drift 16 feet on the vein $1,675 net was taken out. This was simply from the mineral in the drift, and the ore-bodies above and below are left for future work.

Mr. Koontz has leased the ground west from the discovery shaft, and active work is being prosecuted.

The Shenandoah Valley, just below the Free American, is worked through an adit or drift. About 900 feet of development disclose a vein 3 feet wide, containing a pay streak of the width of from 6 to 12 inches, which will average $400 per ton.

The Highland Lassie, on Red Elephant Mountain, shows a vein of nearly solid ore about 8 inches thick, which mills about 40 ounces silver and 30 to 40 per cent. lead.

On Columbia Mountain, across the gulch, is found the Joe Reynolds mines, of which there are four. All, with the exception of the Joe Reynolds No. 4, have been steady producers during the entire year. Of this group of mines the Georgetown Miner says:

"The O'Connell or main drift is used as an outlet for all the lower workings. From a distance of 680 feet in on this level is started a crosscut north that intersects at the distance of 58 feet from the drift lode No. 1. Drifts are run both ways on this lode, and the breast of the east drift, now being worked by Carlson & Co., shows a fine streak of mineral that mill-runs 175 ounces first class and 113 ounces second class.

"Forty feet east of the cross cut and No. 1 junction is the ground now being worked by W. P. Farris & Co. They have sunk 60 feet and are drifting both ways from the bottom of the shaft. In the west drift a continuous streak of ore averaging over 1 foot is exposed for the distance of 30 feet, and in the breast of this drift about 3 feet of pay is exposed. The drift east from the shaft shows the same streak of pay, and ore from this lease averages 200 ounces to the ton, mill-run.

"In the ground leased by D. W. Herrick & Co. a large engine chamber, 32 feet high by 52 feet long and 16 feet wide, has been excavated. A hoisting engine will be placed in position as soon as the shaft is deep enough to require hoisting works. The necessary steam will be carried through pipes from the mouth of the O'Connell drift. The engine chamber is well timbered overhead and at the ends. In fact, we may say here that the timbering throughout the whole mine is first class both in workmanship and quality of material used.

"The ground immediately above Herrick & Co. is being worked by Marsh & Co. The drift east on this level, now 140 feet in length, shows mineral the entire distance. In the west end of No. 1, Digny & Co.

have about 10 inches of solid mineral. They are sinking from the drif level and are now about 50 feet deep.

"Thompson & Wallace are raising on No. 1 where the cross cut running south from the O'Connell level intersects the lode. They have 4 inches of ore that mill-runs 300 ounces.

"W. J. Lewis & Co. are sinking the shaft at the junction of the O'Connell level and the cross-cut north, and drifting east on the vein of No. 3. They have three streaks of pay ore continuous throughout their workings. Together the width of these streaks is over 1 foot and mill-runs from 200 to 600 ounces. They have 3 tons of ore ready for shipment.

"Hugh Behan & Co. are raising from the O'Connell level, and have just opened up a streak of sulphuret ore. They have a lot of ore already out and sacked ready for the mill."

The Murray has been a regular shipper, and during the year considerable new developments have been made, but of what character I am unable to state; however, the aggregate of work performed during 1884 amounted to over 300 feet.

The Columbian Chief, which is an extension of the Murray, is worked through the shaft of the latter mine. Though the pay streak is narrow, averaging 6 inches, the ore is quite rich, being a galena and gray copper.

The Multum in Parvo and Kohinoor mines, on Columbian Mountain, have both been large producers. In addition to the constant output of ore, developments have been pushed.

The mines in the vicinity of Empire have added materially to the output of Clear Creek County, and although there is no very large producer, yet numerous properties are shipping small quantities of ore. The Empire City, probably the largest producer in this section, is owned by W. M. Moore & Co. It is located on Covode Mountain, close to the town of Empire.

The Ingersol, on *Covode Mountain*, has a 100-foot shaft with a 14-foot drift near the bottom, where the crevice is 3 feet wide, bearing iron, galena, and carbonate of copper.

Assays from this lode have run from 107 to 149 ounces silver and from 1 to 2½ ounces in gold per ton. Mill-runs from this property have averaged $51 per ton.

The Rara Avis has a shaft 45 feet in depth on a crevice about 10 feet wide, discovered little more than a year ago. A rich flow of silver glance had been found from time to time in the vicinity of this property, but until February, 1883, was never found in place. Assays from the Rara Avis at 4 or 5 feet deep have given as high as 369 ounces silver per ton. An extension west, called Bonanza, promises well. There are only about 40 feet of development on this property.

The Windsor is improving as depth is gained. The upper drift is 90 feet in length; 45 feet below is another, 100 feet in length, where work is now being done. The crevice at the breast is 4 feet wide, with a pay streak 1 foot wide, of iron, bearing galena and yellow copper.

The American Eagle has been shipping considerable ore, while the development consists of a shaft 55 feet deep, from which is run a drift 70 feet. The pay streak averages 12 inches and mills 2 ounces of gold to the ton.

The R. S. Morrison, near the American Eagle, is developed by three shafts, the deepest being 85 feet. The vein, which is 3 feet wide, contains a pay streak averaging 10-inches of galena and iron, and copper pyrites that mills 2 ounces gold per ton. This property has been idle

during most of the year, as has also the Windsor, Cashier, and Smoky Range.

Barrett & Fletcher are working 3 men on the 125-foot level of the Tenth Legion mine. About 10 feet of milling quartz is shown, and nearly 2 feet of ore, which runs from $45 to $50 per ton in gold.

On *Democrat Mountain* the Matilda Fletcher is developed by a shaft and numerous levels, aggregating about 3,000 feet. The vein is some 3 feet wide, with a pay streak about 14 inches that runs from 150 to 200 ounces of silver per ton, the character being gray copper and galena.

The Fred Rogers mine is developed by a cross-cut tunnel and a shaft. The tunnel intersects the vein 108 feet in, and at that point 200-foot levels are run in each direction. The shaft is nearly 400 feet deep, and at intervals of about 60 feet levels have been run which aggregate something like 1,500 feet. The ore streak is about 20 inches wide, composed of galena and gray copper, and runs from 125 to 200 ounces silver per ton and 20 per cent. lead.

At the Astor the shaft has been sunk some 40 feet additional during the year, being down now nearly 100 feet. In this at the depth of 50 feet, also at the bottom, drifts are now being run. No shipments are reported.

On the Polar Star, Lucky Hesperus, and Clift work has been continued during the year, principally by lessees, but no shipments are reported.

The Jordan lode, which was cut last year by the Bonanza tunnel, has produced quite regularly since. The tunnel cut the lode at a distance of 330 feet, when drifts were run each way.

The Moline tunnel has been extended some 300 feet during the year, and is now in about 800 feet.

Of the Colorado Central, one of the mines of Georgetown, Colo., the Courier says:

"A singular phenomenon of this mine is the vein of obsidian or volcanic glass found between the north mineral and wall. The north wall of the mine is porphyry. Next to the porphyry is a thin selvage of grayish material, which is quite solid when taken out, but rapidly becomes friable and clay-like when exposed to the atmosphere. Next to this is a vein of obsidian, varying in thickness from a thin seam to 10 feet and averaging about 30 inches. This has been found to be continuous for 2,000 feet in length in the workings, and crops out at the surface 2,500 feet west, where it crosses to the north side of the dike of porphyry. Another selvage of clay-like material lies between the obsidian and mineral vein."

A promising prospect is the Pendery lode, located on Democrat Mountain, north side of Silver Gulch. The developments show two cross-cut tunnels, one of 200 feet and the other of 75 feet, and one shaft supposed to be 80 or 90 feet in depth. The vein in this shaft and in the 75-foot cross-cut shows a width of 25 feet between walls, the whole crevice being sprinkled with mineral. The ore at present is of low grade, running from 25 ounces silver upwards and from 50 to 74 per cent. lead to the ton.

The most prominent producer is the Corry City lode, which is at the end of the Diamond tunnel. The Georgetown Miner says of it:

"The new hoisting works and engine-house, which have been erected since February 5 of the present year, are perfect in their work, and facilitate greatly the working of the mine. The main shaft is upon an incline, and is about 175 feet deep and well timbered. Instead of the usual bucket and slide apparatus used in hoisting, a car and track upon an

incline have been substituted. The loaded car, upon its arrival at the top of the shaft, dumps itself into another car, and is carried thence to the dump or ore-house. The shaft now being used was started 15 feet east of an old shaft and raised to the surface. The second and main level now worked extends 113 feet east and 65 feet west. In the east end of this drift is at present but a small streak of ore, but increasing. In the stope over this drift is a fine streak of ore that varies from 2 to 8 inches in width. From this stope has been taken during the past two months over $5,000.

"In the stope over the west end of this drift is also shown a pay streak, varying in width. The main shaft is about 40 feet below the second level, and the mineral taken from this pays the expense of sinking.

"The upper level is drifted east about 145 feet. Good pay has been taken out and the stope over this level is paying now. It is worked by sublessees. Other small drifts and cross-cuts have been run, and though some have not shown a continual pay streak, it is a remarkable fact that the entire crevice, over 16 feet wide, shows mineral. The ore in the Corry City runs, assorted, at present, 135 ounces per ton, but would bring 250 ounces if sorted closely. The cobbings, in which can be seen but little mineral, bring $45 per ton over expenses. Even the dump, it is said, will pay handsomely as concentrating material."

The Pay Rock mine has been undergoing numerous improvements, which are proving not only beneficial to the workings but economical for the owners.

An average of 60 men has been employed on this property during the year, various levels having been worked by lessees.

The new strike recently made in No. 3 tunnel level is still producing fine ore and increasing in size. The width of the streak is now over 8 inches and will run 800 ounces per ton. Many tons of concentrating ore are being taken from the dumps and will be sent to the mill as fast as the tram can move it. In the breast of the main drift, over 900 feet from the surface, the pay streak of concentrating stuff is over 3 feet wide.

Pay Rock concentrator is situated on the north bank of the creek, at the foot of *Republican Mountain*, and a short distance this side, Silver Plume. It was run a portion of last year, with good results. The ore from the tramway is dumped into a chute that leads to the first floor of the mill, where it enters the crushers, and, passing thence through a system of rolls, is deposited in the jigs, where the ore is partially separated from the rock, the remainder passing to other jigs, and so on until the finest is at last received upon an immense revolving floor in the basement of the building. It takes only 3 men to attend to the mill and do all the necessary work to keep the same in running order.

During the month of February 6 tons of mineral were shipped from the Vulcan, milling over 300 ounces silver per ton. In all the openings on the mine good paying ore is encountered. No. 1 level is now 800 feet in length. Four hundred feet have been run on the vein proper, and there is a good streak. At a distance of 265 feet above is No. 2 level, some 400 feet long, which has exposed from 8 to 10 inches of solid mineral, milling over 400 ounces per ton. A shaft from the first level has been sunk 50 feet. It shows for the whole distance from 4 to 6 inches of excellent mineral. From the bottom of this shaft the lessees have started drifts east and west. The pay streak in both places sizes up well, averaging from 4 to 6 inches. Stoping above the first tunnel shows a pay streak from 1 to 6 inches wide, a mill-run of which gave, first class, 550 ounces silver, second class, 300 ounces silver per ton.

he fourth stope east has an average pay crevice of from 1 to 4 inches, hich mills 276 ounces silver per ton. In stoping east of the last, a reak of quartz, with mineral interspersed throughout, has been exosed, which milled 141 ounces per ton. In the west workings stoping s carried on in from 1 to 3 inches of 180-ounce ore. The main drift on he Vulcan vein is being extended. A stope above has just been tarted, opening out a fair grade of mineral, averaging from 4 to 8 inches n thickness.

The Lebanon Mining and Tunnel Company have worked their property constantly through the year and shipped considerable ore. The levels have been extended, the shafts sunk deeper, and development pushed without interruption.

The Snow Drift has been worked by lessees during 1884, and considerable ore was shipped. This is a finely developed property and on a vein that pays handsomely on money expended. It is opened by three cross cut tunnels, aggregating 918 feet, and two shafts, the aggregate of which is 260 feet. There are 800 feet of winzes and 3,500 feet of levels. Throughout the entire body can be found a vein 6 feet wide, whose pay streak varies from 6 to 14 inches of solid mineral, the character being sulphurets, galena, and gray copper, that will average over 200 ounces silver to the ton. This mine was recently purchased by Daniel Weld, of Boston. The engine chamber was completed, the boiler placed in position, and a new plant of hoisting machinery put in working order.

The Peterson shaft, over which the new hoisting engine is being placed, is now down 70 feet, and is to go to a depth of 400. Levels will be run every 60 feet east and west from the shaft. A 2-inch streak of rich ore is shown in the bottom of the shaft and the breast of the tunnel level east.

The Fulton, an extension of the Mendota and worked through the same outlet, has shipped some ore. The lessees have done no stoping yet, and the mineral just shipped is from the drifting.

The Coldstream Consolidated Mining Company own a group of five mines on this mountain, which have added much to the output of 1884. The mines are worked entirely by lessees, who are constantly extending the developments and extracting the ore.

The Dunderburgh also gives employment to a number of miners, and and the result is that shipments have been quite regular. This company have sunk their shaft 50 feet additional, and at that depth, 450 feet, levels are being run, the vein disclosed being similar in all respects to that found in the upper workings.

On the Bismarck were 200 feet of new developments by drifts and cross-cut tunnels and 100 fathoms of stoping. Fourteen men are employed on the mine and considerable ore is being produced. Drifting and stoping are being done on level No. 1, and 2 inches of 150-ounce ore have been found. A winze is being sunk to connect levels Nos. 2 and 3. In the bottom of this winze, which is down 45 feet, a 12-inch streak of 100-ounce ore is exposed. No. 3 level, which is 100 feet below No. 2, is now in 460 feet, in the breast of which there are 6 feet of quartz, which is disseminated with mineral.

The Bismarck lode has been cut through the Independence tunnel, at a depth of 300 feet. A drift has been run 18 feet east, in the breast of which are 6 inches of solid ore of a good grade. No runs have yet been made from it. Another drift has been started west, exposing considerable scattered mineral.

A cross-cut is being driven from the breast of the McLinn lode to cut the Saint Julian vein. The crevice is 8 feet wide, and 2 inches of solid ore

are shown on the foot-wall, while mineral is scattered throughout the entire width. No tests have yet been made from this ore, the character of which is copper and galena. The Saint Julian lode will be intersected within 40 feet.

The Terrible, the property of the Colorado United Company, has shipped 4 tons of first-class ore, that milled 915 ounces silver, the second class running over 300 ounces silver. The pay streak is over 7 inches in width and promises to hold out. This mine is now shipping more ore and of better grade than perhaps ever before. There are over 200 feet of water in the lower workings of the mine, though the pumps are kept steadily at work.

The Silver Ore shaft is now between 700 and 800 feet in depth. In the drift easterly from the bottom of the shaft are disclosed from 4 to 6 inches of 250-ounce mineral, carrying fine-grained galena, gray copper, and some ruby silver. The main shaft is still sinking and has now about reached the distance at which drifting east will at once begin. This level will be continued for the purpose of intersecting the large ore-body supposed to exist ahead. Stoping is being done on the tenth level, in from 3 to 6 inches of high-grade ore. Stoping west on the twelfth level, a fine streak of mineral from 8 to 4 inches, carrying gray copper and ruby silver, has been found. It mills from 400 to 500 ounces silver per ton.

The Seven-Thirty property, composed of a number of claims, has been worked for the past fifteen years and has been one of the most steady producers of high grade ore in the country. This main vein is a true fissure in walls of granite and porphyry and varies in width from 4½ to 25 feet. The smelting ore shipped will average 150 ounces silver per ton. The developments consist of a main shaft 400 feet deep, and other shafts, drifts, and winzes aggregating over 2 miles. Drifts from the main shaft have already reached a depth of 800 feet below surface and are gaining depth as they are driven into the mountain. There are twelve drifts, being driven at the present time, some of which show fine bodies of smelting ore, especially four drifts heading east. These drifts are constantly opening up new ground and give employment to 80 men. The owner, H. M. Griffin, says of it:

"The Seven-Thirty mine embraces one of the most important groups of mines in Clear Creek County. Here are twenty-one patented claims, covering between 70 and 80 acres of surface ground and extending along the main vein a distance of over a mile. These veins were discovered some fifteen years ago, and have been profitably worked at or near the surface, along nearly the whole length, up to the present time. In the course of these partial explorations about 2 miles of underground drifts and cross-cuts have been made and many thousand feet of shafts and winzes. The main shaft is 400 feet deep and some of the drifts from it have gained a depth of 800 feet below the surface and are from 1,000 to 1,500 feet in length. But the mine may be said to be still in its infancy, since the tunnels now being driven to intersect it will cut the vein at a depth of 1,000 feet below the bottom of the present main shaft and open stoping ground of vast extent.

"The walls of the vein are of granite and porphyry, the matrix or filling varying from 5 to 25 feet, the whole of which is more or less mineralized and suitable for concentration, while the smelting ore occurs in seams of from 2 inches to 2 feet in thickness and carries from 50 to 1,500 ounces of silver per ton. The smelting ore is generally galena and blende and the minerals known among miners as gray and yellow copper, ruby, wire, and brittle silver, rosin, zinc, and antimony, with oc-

casional sulphurets. Copper and gold occur in small quantities, and 15 to 75 per cent. lead in the richer grades of silver ore.

"During the last year prospecting has been carried on and 50 to 75 men constantly employed. Seventeen hundred feet of new drifts have been opened, much valuable mineral encountered, and the stopes left in reserve. These show large bodies of rich ore. During the year 1884 92,734 ounces of silver were sold.

"Ten main drifts, laid with T rails, are at present being driven, new ground opened, and the reserves increased. These mines, although situated at an elevation of over 10,000 feet, are approached by a good wagon-road, and are all worked without difficulty all the year."

The Baltimore Tunnel Company is one of the largest enterprises in Colorado. The following description is from the "Miner:"

"The main shaft on the Baltimore is started a few feet east of and on the tunnel level, and is now over 300 feet deep. Levels are run every 60 feet both ways from this shaft, and the showing of mineral is uniform in the greater portion of the mine, especially in the lower workings. On the lowest level a drift has been run 84 feet east, showing a continuous streak from one end of the drift to the other averaging 4 inches in width.

"The west drift of the lower level shows several small streaks. The fifth level west shows a fine streak on the foot-wall and several small streaks in the center of crevice and near the hanging wall. This drift is now in 70 feet, and shows a fine, solid streak almost the entire distance. A stope 20 feet high from this level has good pay in it. Ore from this level gave mill returns of, first class, 605 ounces per ton; second class, 380 ounces per ton.

"In the fourth level west is a 4-inch streak of fine ore. In the stope over this level the mineral holds out well, in some places even increasing in width as the raise is made.

"The mineral from the Baltimore is uniformly high grade. The improvements on the Baltimore are all first class; the drifts are wide, kept clean, and well timbered. All the stulls are put in to stay, and are of a size that insure against the possibility of accidents. The mine, though usually a dry one, is now somewhat troubled with surface water. The hoisting works do the work in a satisfactory manner. Pipes carry the steam for the working of all the inside machinery from the boiler at the mouth of the tunnel.

"The Fenton, another lode belonging to the Baltimore Company, and intersected in the fifth level east of the Baltimore lode, is extensively worked, and has been and is now a good producer.

"The old Fenton shaft, that starts from the tunnel level, is now being cleaned out, and will be sunk 20 feet deeper, to connect with the fifth level at the junction of the two lodes. This will faciliate the working of all the eastern parts of both lodes through the Fenton shaft, thus leaving the outlet through the Baltimore shaft to be used for the western workings. The underground improvements on the Baltimore consist of the Baltimore main shaft, 308 feet; tunnel level, east, 162 feet; tunnel level, west, 469 feet; level No. 2, west, 437 feet; level No. 2, east, 162 feet; level No. 3, west, 407 feet; level No. 3, east, 162 feet; level No. 4, west, 226 feet; level No. 4, east, 162 feet; level No. 5, west, 130 feet; level No. 5, east, 162 feet; level No. 6, west, 85 feet; level No. 6, east, 90 feet.

"All ground from the third level east has been stoped out, and the major portion of ground from the fourth level up, and as far as levels have been driven, is worked out.

"Part of the ground from the fourth to the third level east, all t ground from the sixth to the fourth level east up, and all from the six to the fourth level west, and all west from ends of levels west are yet be stoped and drifted upon.

"Several winzes have been sunk between the levels.

"Total number of pounds produced in the month of May was 60,00(

The Independence mine, in *East Argentine district*, is turning out son good pay. Three inches of ore were recently struck in the third leve In the second level they have 1½ inches of ore that is reported to assa 1,021 ounces. In the same level they also have a 2½-inch streak tha assays 484 ounces. A streak in No. 4 level has been struck in the las few days.

Some prominent mines are located on *Sherman Mountain*, of which th largest producer is probably the Mendota, the different drifts of whicl are under lease to various parties, and the work of the year has con sisted principally of stoping out and sinking new winzes and drifts.

The Tishomingo, on the same mountain, is a recently discovered pros pect, in which some good ore has been found and is worked by lessees In the breast of the drift, 145 feet from its mouth, it is said that 10 inche of 200 ounce ore have been exposed, and a stope has been started in it The second lease is worked through a 65-foot shaft. A tunnel has bee run to intersect the Mendota, Tishomingo, and other lodes belongin; to the same parties, which is now in over 700 feet. The tunnel is 8 b; 8 feet in the clear.

The Albro mine is an old mine which has been idle some years, and i a patented claim of 400 feet linear measurement and 50 feet in width The present owner has secured the east and west extensions by letter patent, the former being known as the Veta Grande and the latter a the Veta Madre of Zacatecos, each being 1,500 feet in length by 15 feet in width, which gives the consolidated property a length of 3,40 feet patented on the main lode. The lode crosses Albro and Hiawath Mountains. All of the adits, except one on Hiawatha Mountain hav been worked out. On this a plant of machinery has been erected of 2 horse-power capacity. Two levels have been run, which aggregate 87 feet. The first level is 547 feet in length, 411 feet of which expose vein of ore from 10 to 30 inches in thickness. Some stoping has bee done, with very remunerative results. Some of the mineral extracte gave the following results: 17 ounces gold, 36½ ounces silver, 12½ p cent. copper. At 181 feet from the shaft a cross-lode was encountere which has never been followed. This level shows a large vein of fre milling ore, which will run under stamp 5 ounces gold to the cord. Tl second level is 332 feet in length; 257 feet to the cross-lode heretofo mentioned, which was never followed at this point either. In the brea of this level, in fact for quite a distance back, a vein of solid copp ore has been exposed, which is 29 inches in thickness. This level, almo its entire length, shows a good vein of ore. The shaft is still bei pushed, under contract, and the bottom now shows a vein of copp ore 15 inches in thickness The third level will be started in a fe days. A good engine and ore house has been erected. There are 1 tons of free-milling dirt on the dump, which it is thought will, und stamps, return 4 ounces gold to the cord. One car-load of smelting c is shipped a week to Denver. The last car-load gave the followi results: Gold, 2.46 ounces; silver, 15.40 ounces; copper, 6 per ce

Seaton Mountain, near Idaho Springs, has been the scene of much tivity, and many of the mines have shipped considerable during t year.

The Freighter's Friend, one of the first discoveries on Seaton Mountain, is being very extensively worked and is producing ore.

This vein, which is one of the largest in this section of the county, was discovered in March, 1871.

It is opened by an adit on the vein, running from the wagon-road in Gilson Gulch a distance of 150 feet. At 75 feet from the mouth of the adit a shaft is raised to the surface, 45 feet. A shaft is also sunk from the adit at this point to a depth of 80 feet. Forty feet below the adit level a level is run east 50 feet on continuous ore, varying in thickness from 1 to 3 feet. From this level considerable stoping has been done and some ore produced. In the floor can be seen three distinct streaks of mineral, varying in width from 6 to 15 inches. At the same depth a level has been run west 35 feet on a continuous body of ore that will average 1 foot in width in the floor, breast, and roof. These levels were run for prospecting only.

At the bottom of the shaft a level has been started west on a body of 18 inches of solid ore. This level is being pushed ahead night and day.

The Garden lode is doing development work, and ore shipped assayed as follows:

Dry weight.	Value per ton.	Received.
9,259	$78 00	$361 10
3,548	89 91	159 50
Total.....		520 60
Less cost of sampling.....		38 30
Actual amount received.....		482 30

The Star mine, which is on the main fissure vein running northeast and southwest, from the Seaton mine to the Silver Glance mine, 4 miles southwest, has been undergoing a course of development that has put it in a position of a producing mine. It is developed by an adit tunnel 200 feet long at a depth of 120 feet. The ore is composed largely of gray copper and galena and averages one-half ounce of gold and ninety ounces silver to the ton. A shaft is being sunk; the present depth is 105 feet.

The mineral is on the porphyry hanging wall, but the owners claim that the richest mineral is on the foot-wall, which they had to leave 25 feet from the surface, owing to the widening of the vein as they went down. Assays from the hanging-wall streak above the last strike ran half ounce gold, 59 ounces silver, and 14.7 per cent. copper; and an assay taken from foot-wall 10 feet from surface ran one-eighth ounce gold, 174 ounces silver, and 71 per cent. lead.

The Tropic has been constantly worked during the year, and although it has yielded a number of years, developments have not reached a very great depth, 275 feet being the deepest.

There are four levels running east and west from the shaft, on which there has been about 3,250 feet of drifting. The vein is 7 feet between walls and contains a mineral streak that averages in width 12 inches and in value $200 per ton.

The Little Mattie mine still remains unproductive, although considerable money has been spent on development.

The Freeland mine produced during the year 1884: Gold, $281,000; silver, $60,000; copper, $3,000; total, $344,000. Running in connection

with this mine is a smelting plant. The ore is reduced here, and a lar percentage that would otherwise be paid for transportation is save the ore being very low grade.

The Gum Tree, Donaldson, Champion, Silver Glance, and Gre American have been worked, and each have added to swell the outp figures of Clear Creek County during 1884.

The Old Settler, situated on the divide between Turkey and Tr Creeks, was discovered in 1860, and large quantities of surface qua were found, which created great excitement. It was constantly work till the fall of 1864. The vein has been thoroughly prospected on t surface by shafts sunk to the depths where copper ore was obtaine carrying about 1 ounce of gold to the ton. Copper and silver in ea days not being mined for, this ore was not thought sufficiently rich pay, and the original owners abandoned the mine, but it has since be relocated.

The developments consist of the main shaft, 255 feet deep, levels ea and west being driven at 240 feet from surface. Stoping is being do between the west level and surface. In this stope a pay streak can seen of from 1 to 2 feet in thickness, which, after sorting the smelti ore, returns 7 ounces gold to the cord. The smelting ore runs very hi in gold and copper, and is treated at the bullion smelter at Freela The mine, under the new management, is being economically a practically worked.

The Bracken mine, on Turkey Creek, is situated on the high mounta on the west side of Clear Creek, between Fall River and Trail Run. is opened by a shaft and two tunnels run in on the vein from what known as Turkey Creek. The lower tunnel, which is cut by a cross-c 56 feet in length, is some 200 feet in length on the vein. Near the ce ter a winze connects this with the upper level, which is 80 feet in lengt The ore of this mine is of low grade, but in large quantities. White an yellow iron, with yellow and carbonates of copper, constitute the mai minerals. The vein in the tunnel is from 5 to 7 feet in width and almo entirely mineralized. Veins of the white and yellow iron, running fro 6 inches to 15 inches in thickness of solid mineral, extend nearly th full length of the tunnel. In the roof of the tunnel and on the hangin wall arepockets of carbonate and the black oxide of copper. From to 15 inches of mineral have been left on the hanging wall in runnin the tunnel. The vein matteris a fine white quartz or silica, excessivel hard but most beautifully mineralized. An average assay of the entir mineral shows a value of $30 to $40 per ton in gold, silver, and coppe at a depth of 125 feet from the surface.

At Fall River the hydraulic mines of the Alice Placer Mining Com pany have not been worked extensively, small portions only having bee leased and worked on a small scale and something like $12,000 extracte

The Crystal, situated in Virginia Cañon, is developed by six shaf from 60 to 90 feet in depth, and a tunnel is now in a distance of 275 fee This mine has been worked off and on since 1862 and continuously b the present leaser since 1881. During the year the old shafts have bee cleaned out and put in working order and new tunnels have been drive

From the Swan mine, on Chicago Creek, some ore has been taken.

The developments consist of a cross-cut 150 feet in length, a drift fro the breast of the cross-cut on the vein 400 feet, a shaft in the drift feet, and a raise from the level to the surface about 65 feet; also co siderable stoping.

On Cascade numerous mines are being worked, some with good r

sults. Among them are the Charter Oak, Eclipse, Mary Foster, Humboldt, Oneida, Royal Oak, Silver Link, Argosy, Black Hawk, and possibly fifty others. Veins are numerous and claims in proportion.

The Keith Mining and Milling Company own seven full sized claims on Keith Mountain, *Downieville district.* The company also own a mill site, water right, and a tunnel site of 2,000 feet. The tunnel is now in about 160 feet.

The developments on the Brown claim consist of two shafts, both of which are about 30 feet deep, showing a very strong vein of gold quartzite, which, according to the last mill-run, gave 11 ounces gold to the cord.

The Logan lode, near Dumont, shows 2 feet of mill-dirt in the breast of the first level east, that prospects 4½ ounces to the cord. In the bottom of the shaft the same streak runs 3½ ounces to the ton.

The output of the Frontenac from October 1, 1883, to April 1st, 1884, was 495,299 pounds; value, $8,516.82.

This ore came from the surface and down to a depth of 60 feet. The mine is situated over the brow of the mountain from the Jewel.

The Range Line mine is located in Ohio Gulch, about a mile from the town of Dumont. The shaft is 60 feet deep and has produced quite a lot of mineral. A level from the bottom of the shaft, and another some 30 feet above it, shows a continuous vein and ore-body. The vein varies in width from 18 inches to 2 feet, with from 4 to 6 inches of a pay streak. The ore is gray copper, iron pyrites, and galena. It mill-runs 150 ounces silver per ton. Some 3 tons of the first class are awaiting shipment. No stoping has as yet been done, and the ore reserves are therefore in place.

The Senator, situated on *Capital Mountain*, in Ohio Gulch, is being vigorously worked. The vein proper measures 14 feet between walls and shows a pay streak 18 inches wide of quartz and mineral. The character of the mineral found is galena and gray copper. It mill-runs 150 ounces silver per ton. Drifting from the bottom of the main shaft is being pushed rapidly ahead.

CUSTER COUNTY.

Though fewer men were at work during the first half of the past year, the production declined but little from that of 1883. Mining was also impeded by heavy snow blockades for five months, which retarded shipments and caused much discouragement, but during the balance of the year work actively progressed.

On the main range of the Sangre de Christo considerable activity was displayed. The Venezuela is the only property that has steadily kept up its working force. The manager reports that the company were engaged in sinking on a formation which carries a fair amount of mineral-bearing quartz east of the main incline, and are now working down 400 feet from surface and making for the hanging wall, which apparently dips in that direction. The values are to be secured at the present time only by hand-assorting, and these are piled up and stored in the ore-house.

The Bassick property, situated on a spur of Mount Tyndall, has been constantly worked during the year. A fine plant of machinery has been put in place, the entire weight of which is estimated to be more than 600,000 pounds. Very little new development work was done, the 1,000-foot level being the lowest. Water has not caused as much trouble as formerly.

On the Bull Domingo a large force of men were put to work to extract

re disclosed by a winze between the 350 and 450 foot levels. The ore-body, for a short distance before reaching the 450 foot level, dips toward the shaft and indicates quite an angle in that direction, which will affect future workings. Most of the ore between and above the 450-foot level was stoped out, and the main working shaft has been sunk 200 feet additional, making a total depth of 550 feet. Thirty tons of ore are said to be extracted per day, and the number of hands employed at mine and mill is not far from 60 to 70.

The workings of the Westphalia lode are below 100 feet, in a streak of about one-half foot, which runs fairly in galena and some gray copper, the mill-run showing a value of about $70 per ton.

The Immortal, near the Bull Domingo, has recently been leased, and it is expected that work will be commenced on the original shaft as soon as new machinery can be planted. The shaft is down 127 feet. Recent developments on the King of the Carbonates induced the owners to employ a force of miners in sinking a shaft. At a depth of 90 feet numerous veinlets of mineral began to come together, and at 110 feet there was formed a vein of galena 2 feet wide, carrying from 20 to 60 ounces of silver per ton.

The Leavenworth mine, discovered in 1874, in *Hardscrabble mining district*, is developed by 2,000 feet of shaft, level, drift, tunnel, and winze. The ore characteristics near the surface are chlorides, carbonates, and gray copper, while depth shows heavy gray copper, sulphurets, silver glance, zinc blende, and ruby silver; pay streak from 14 to 6 inches. Ore shipments range in value from $115 to $600 per ton.

The Pocahontas and Leviathan have both been inactive. The Silver Corn Group, on *Democrat Mountain*, is now added to the list of Custer County producers. The development work upon the Silver Corn claim consists of a shaft 115 feet deep, at the bottom of which a drift has been run 60 feet to the west and 30 feet to the east. The character of its mineral is said to be similar to that of the Bassick mine, which is but 2 miles distant. On the California, Concord, Twenty-six, Virginia, Michigan, Susan Jane, and Nellie more or less work has been done, but the shipments, if any, have been small.

The Racine Boy, the property of the Silver Cliff Mining and Milling Company, after three years' idleness, changed hands and is once more a producer. This was the principal mine that caused the stampede in 1879 to Silver Cliff, but after its sale by the original owners the property ceased to produce and the mine was closed.

The Kate mine, on the same vein as the Racine Boy, has a number of car-loads of ore.

Recent strikes are reported in the Immortal, but the developments are only nominal. Work continues in the 95 foot level, and the ore-body, though not extensive, has increased from a 3-inch streak to one of nearly 20 inches, while the mineral is growing in value as the body increases. That taken out consisted of sulphurets and very fine galena, heavily impregnated with copper pyrites.

Three men are now at work steadily on the July Bird. The ore is a siliceous carbonate of lead, assaying 28 per cent. lead and from 174 ounces up in silver. A large force of men has been employed on the Buffalo Boulder mine and mill.

DOLORES COUNTY.

Comparing the past year with 1883, probably no county in the State shows proportionately so large a falling off in the yield of its mines as Dolores. For this decline no special reason can be assigned.

In 1883 the county produced in gold $5,000 and silver $250,000, and the base metals were estimated to be worth $35,000. For 1884 the total production of gold, silver, and lead is not more than $75,000.

The new Pasadena smelter, which was planted during the year, has been successful in every way and is running day and night.

The Grand View smelter made a run of twelve days and reduced 175 tons of ore from the Grand View, Phœnix, Swansea, Hope, and Cross mines, producing 82,000 pounds of bullion, valued at $22,500. The Santa Clara mill since October 1 has been in operation. It has a capacity of 20 tons per diem, and has produced and shipped bullion valued at $18,000 from ore taken only from the Puzzle Extension mine.

The Rico reduction works were in operation about a week and produced from Puzzle Extension ore about $5,000.

The Pasadena reduction works operated twenty-five days in November and reduced 450 tons of ore, netting 71 tons of bullion, valued at $30,000. They started up on December 26 for a continuous season's run, and have built additional offices, laboratory, sales-room, and manager's residence. They have on hand about 400 tons of ore, valued from $25,000 to $27,000.

RECAPITULATION.

Grand View smelter	$23,000
Santa Clara mill	18,000
Rico reduction works	5,000
Pasadena	30,000
Net bullion output	76,000

The following shipments from the Pioneer district are reported:

Name of mine.	Tons.	Name of mine.	Tons.
Lela Davis	150	Dayton	5
C. H. C	275	Premier	3
Pigeon	40	Privateer	3
Black Hawk	20	Wabash	200
Swansea	15	Fort Wayne	5
Honduras	10	Dude	75

The Cross and Puzzle mines have not been worked during the year. The Puzzle Extension was for a time supposed to have been exhausted, but in October a lease was made, under which the property has since been worked.

On the Puzzle Extension day and night shifts are at work on the incline which is to be used in taking the ore and waste from the mine. The shaft is down 90 feet. At the foot of the hill ore is being hoisted by a one-horse whim, with a capacity of 3 tons per hour. The vein of quartz contains native and antimonial silver and some chlorides of silver. Without much sorting, the ore is hauled three-quarters of a mile to the Santa Clara mills, where it is treated by an amalgamation process, the average running over 100 ounces.

The Johnnie Bull mine remained idle throughout the year; in December the property was sold at sheriff's sale, bringing but $2,600. The new owners put a force of men to work to clean out the old workings and put the mine in shape to continue explorations and development.

The Omaha, White Rock, and Rockland, all promising prospects, near the Johnnie Bull, have received assessment work only.

On the Dolores Mountain, south of Rico, is the property of the Marr's Consolidated Mining Company, better known as the Newman group of

mines. The group is composed of the Newman, Chestnut, Swansea, V L. Stevens, Parsons, Tip Top, and Ocean Wave. These mines laid id almost the entire year.

The Grand Duke Mining Company did nothing until the latter pa of September, when a large force of men was put to work cleaning o the various shafts and levels. The developments on the Grand Du consist of an incline 200 feet, with two levels, each about 100 feet, on t Forest mine, as one shaft 179 feet, another 100 feet, and a drift 179 fee on the Eureka, a 60-foot incline; Dawn of Day, two shafts, one 72 fe the other 80 feet, and a drift 50 feet; Orphan Girl, a tunnel 52 fe where an open cut 50 by 30 feet is made in a body of iron flux. T character of the ore is a lead carbonate, averaging $50 per ton.

The Little Maggie has been shut down. The Pigeon has continu work. Quite a lot of ore is out and placed in the shaft-house. Assa made from four lots are reported to have shown from 12 to 32 per ce lead and from 61 to 128 ounces silver per ton. The Lelia Davis p duced some ore during the latter part of the year averaging, since N vember 5 tons per day. The vein is opened by a tunnel and shaft, t first named being 335 feet long, the latter 185 feet deep. The vario drifts and winzes aggregate 290 feet.

The Wabash, owned by the Wabash and Democrat Mining Compan is a well-developed mine, throughout the workings of which is found 3-foot vein of mineral, whose average value is $45 per ton. In drift shaft, and winzes the total development aggregates 600 feet.

The C. H. C. mine ships its ore to the Pasadena smelter. It is de veloped by a shaft 125 feet deep and a tunnel 250 feet long; as yet ther are only some 160 feet of drifting. Three shifts are lengthening thes drifts and pushing developments. About 240 tons of ore, averaging 12 ounces to the ton, have been shipped during the year.

The Flora tunnel is now in 85 feet on the vein. The claim is on the north side of Telescope Mountain and is about 1,000 fee from the end line of the C. H. C. The vein as shown is made up of from 4 to 5 feet of vein matter, pocketed throughout with mineral. Tests have shown 139 and 141 ounces per ton in silver and 49 per cent. in lead, and on a carbonate ore 53 ounces in silver.

The Intra Muros Mining Company owns a group of claims on this mountain, consisting of the Little Pittsburgh, Mohegan, Blue Bird, and Stranger.

The Little Pittsburgh is the only producer of the group, and probably the best developed. On the Aztec Gulch side of the mountain a tunnel has been run about 300 feet and a shaft sunk 225 feet. On the other or Iron Gulch side of Expectation Mountain is a tunnel 100 fee in length and a shaft 40 feet in depth. A cross-cut tunnel has also bee run which cuts the vein at a depth of 180 feet. The workings disclos a 14-foot vein of quartz, throughout which the mineral is scattered.

The other claims possess more or less development, each vein show ing mineral scattered through quartz. Other prominent prospects o this mountain which have been worked during the year, although n production is reported, are the Clyde, Flying Fish, Shamrock, an Bancroft.

The J. E. W. tunnel has been worked several months. The formatio has uniformly been lime. The tunnel is now in to the length of 240 fee The veins of the I. X. L. and the Carrie mines have been encountere and cross-cut by it. Each of these veins is from 4 to 5 feet wide, wit pay streaks of from 7 to 8 inches. A drift was run on the I. X. L. vei

a length of 50 feet, when the work of the main tunnel was again resumed.

The Hildebrand Mining Company have been doing some work on the Eliza Jane, but have not shipped ore.

On *Democrat Mountain*, near the town of Bowen, the properties have made but little advancement. The most prominent prospects are the Rico, Little Emma, Little Susie, Little Wonder, and the extensive property of the Dolores Valley Mining Company.

At *Silverado* the Silverado Copper Mining Company are working extensively. The property consists of twenty-two claims, whose veins average from 2 to 12 feet wide, the vein-filling being an oxide of copper that carries but very little silver.

DOUGLAS COUNTY.

The only mining district worked in this county is located along Cherry Creek or its tributaries. In this creek gold was discovered in Colorado in 1859, but, owing to the lack of water, mining operations have been conducted on a very small scale, and will so continue until water can be conveyed hither or some process can be invented which will enable the miner to dispense with its use.

During the summer one of the Bennett Dry Amalgamators was tried, and, as is claimed, worked successfully.

The gold found in this county is probably as pure as any found in the world. Its average fineness is .990, although deposits at the mint will often run to .998½. The auriferous pay gravel in this section has a thickness of from 10 to 40 feet, that will pay from 5 to 20 cents per cubic yard.

In Dry Gulch, Mr. Cyrus Curtis, who worked for a number of years about one day in seven, has built a dam up the gulch which collects the water. This is allowed to pass into a ditch half a mile long, thence through a sluice. The contrivance is simple and the workings primitive, yet for a number of years Mr. Curtis has made two or three deposits of gold at the Denver mint, the value ranging from $100 to $500 each year.

The deposits in the vicinity of Elizabeth cover considerable area and have occasioned some excitement. The lack of water, however, is a great drawback. John Ferris, who owns a deposit, sunk a well 90 feet, from which he obtains his water supply by the bucketful. This method is tedious and expensive, but Mr. Ferris employs 3 men during the winter and claims to be paying expenses. Through the summer quite a number of persons mined in this section, using a common rocker or panning. The production of Douglas County during 1884 was about $1,100 in gold, silver nominal.

EAGLE COUNTY.

This county shows a material falling off from the production of 1883. The mines of Battle Mountain and vicinity, the main producing center of Eagle County, contain mostly galena ores, which formerly were in demand for smelters, but now that the price of lead has declined the mine-owners have not worked their properties to any great extent, and have extracted only ore sufficient to pay expenses in exploration and development.

The Belden property remains in about the same condition as at the beginning of 1884, with the exception that a few large blocks of ore have been removed. The ore is of low grade, but a kind greatly in demand for smelting purposes.

The Belden shipped during the year 1,640 tons of ore, which returne as follows:

Ores.	Quantity.	Price.	Value.
Lead.....tons..	568	$72 00	$40,896
Silver.....ounces..	16,400	1 10	18,040
Gold.....do ..	21½	20 00	430
Total.....			59,366

The Little Chief has been worked constantly, the ore going to the smelting works at Leadville.

The Crown Point is worked through a tunnel now about 200 feet in length; from this tunnel two inclines are run down on the contact, one 90 feet and one 175 feet, and both disclosing mineral the entire length. Higher up on Crown Point is another tunnel, 160 feet long, from which is also run an incline, which shows large bodies of ore. Throughout this property the workings are in excellent order, the ore-bodies being large, but of low grade, averaging in value about 12 ounces of silver, 35 per cent. lead, and probably one-fifth of an ounce of gold per ton.

The Clinton group has not been extensively worked during the year, only a small amount of ore having been extracted.

The Cheeseman and Clayton group of mines, formerly the property of the Eagle Bird Consolidated Mining Company, is the largest producer in the county.

The Eagle Bird, Black Iron, and May Queen are the only claims which have been worked, and only sufficient work has been done on them to pay for the force employed in developing the various other mines of the group. Fully 500 feet of development work has, however, been done since July. As the shipping was not commenced until late in the summer, the amount of ore shipped was necessarily small.

The Eagle Bird shipped 2,090 tons of ore, assaying 31 per cent. lead and 8½ ounces silver, giving 647 tons lead and 17,765 ounces silver.

Black Iron produced 378 tons of ore, assaying 41 per cent. lead and 9 ounces silver, giving 154.98 tons lead and 3,402 ounces silver.

The May Queen forwarded 30 tons, which returned 39 per cent. lead and 8 ounces silver, giving 11 tons lead and 240 ounces silver.

The total of these mines comprising the Cheeseman and Clayton group was as follows:

Ores.	Quantity.	Price.	Value.
Lead.....tons..	814.58	$72 00	$58,650 76
Silver.....ounces..	21,407	1 10	23,547 70
Gold.....do...	157	20 00	3,140 00
Total.....			85,347 46

The Kingfisher group has shipped but little ore, on account of the decrease in price of lead.

The Spirit shipped some ore, averaging $35 per ton net, consisting of sand carbonates which run about 30 per cent. lead, 12 ounces silver, and one-tenth ounce gold per ton.

The shipments from the Little Chief, Crown Point, Kingfisher, Iron Mask, Spirit, Clinton, Cleopatra, Great Western, and Potvin have amounted during the year to some 597 car-loads of mineral, aver-

ons to the car; 32 per cent. lead and 8 ounces silver per ton
5,970 tons of mineral yielding as follows:

Ores.	Quantity.	Price.	Value.
tons	1,910.4	$72 00	$137,548 88
ounces	4,776	1 10	52,536 00
do	250	20 00	5,000 00
			195,084 88

ower end of Battle Mountain is found what is now termed the which extends on the west side of Rock Creek and on the of Eagle River. The most promising of its mines are the og group, Combined Discovery, Uncle Sam, Horn Silver, and Mary.

und Hog group comprises the Ground Hog, Apex, and Silver ms. They are on the quartzite. Each is 300 by 1,500 feet. id Hog extends along the outcrop of the lode for 1,500 feet. and Silver Chord lie above and parallel to it. The develop- sts of an incline of 150 feet, from which run three drifts. All thing over 225 feet of work have been done. Like the Com- overy, the lode conforms in strike and dip to the country rock. nas a thickness of 4 feet. The pay seam is 18 inches thick. tcrop assays were obtained of 28 ounces in silver. A sandy lark iron oxide forms the pay seam. In this mass granular of black sulphurets, and possibly chlorides, are to be seen. ve run from 35 to 200 ounces silver and from nothing to 6 d.

nbined Discovery has been worked by a small force of men. oped by a shaft 120 feet deep and possesses about 200 feet of ne character of the ore is similar to that of the Ground Hog. le Sam and Highland Mary have produced some ore.

e Horn Silver shipments have been limited, but developments pushed. The vein is about 4 feet wide and the pay streak ge 20 inches, principally of red oxide of iron, through which and at times chloride of silver are found scattered. The lue is 120 ounces of silver per ton and about one-fifth gold. s worked through an incline 170 feet long, from which three run, the aggregate amounting to 280 feet.

nbined Discovery, Uncle Sam, Mary Mack, Ground Hog, Sil- lps, Washington, Last Chance, Highland Mary, Eighty-four, Silver are said to have produced ore during the year.

al yield of Red Cliff Camp has been stated to be, from the mines, $339,798.26; from other mines, $125,000; total, 3 (which includes the value of the lead).

icinity of Taylor Hill much work is being done in the way of nt, and McClelland's stamp-mill has been running most of on ore from this locality. It is claimed about $12,000 was during this time.

Cross Camp exploitation only has been done; bodies of ore developed, but the actual yield has been almost nothing. The of the camp, reported from ore treated, was $6,400.

al yield of the county, as reported from these three camps, was 3,000, which is a falling off of about 50 per cent. as compared year.

FREMONT COUNTY.

I have not been able to trace to this county any producti precious metals for 1884.

Owing to the small amount of silver found in the ore, the att miners has been turned to the veins carrying copper and zinc less lodes are discovered which possess more silver, copper will years be the main production of the county. Of copper ores an abundance, many veins carrying from 10 to 20 per cen metal.

The Green Gulch Mining Company owns four claims, situate south of Cañon City, consisting of the Melissa, Silver Star, Lady and Lady Washington.

The Silver Star has a shaft of only 30 feet. The developme Lady Martha and of the Lady Washington is nominal. The of their ore is quartz, carrying both gold and silver.

The Dandy lode, 2 miles west of Cañon, has a 28-foot shaft, disclosed being 3 feet wide, the pay streak carrying three-ten ounce gold, 10 ounces silver, and 10 per cent. lead.

The Rocky Mountain Mine Developing Company is working of mines some 10 miles from Cañon, on which there is conside velopment. This property produces copper only, and of this m quantities have been shipped during 1884.

The Red Bird, Cliff, Buckhorn, Pride of the West, and Ro were thought to be promising prospects, were not worked d year; indeed, on some not even assessment work was done.

Mr. Edward Fernleaf, general superintendent of the Iron D ing Company, writes as follows:

"Development commenced on the property of this compa the year 1883, by private individuals, who organized a joint-s pany during the following year. The company owns twelve fu with a surface area of 124 acres. Its claims are about 4 miles Cotopaxi, a station on the Denver and Rio Grande Railway, and the Arkansas River and the Sangre de Christo Range of mou north latitude 38°, west longitude 105°; altitude about 6,500 mate good, fuel and water plenty, and transportation faciliti lent.

"The company located all its claims and contracted no debts opment on the Iron Dollar mine consists in working assessm sinking a shaft 5 by 10 feet. Sufficient work for patent has b on this claim. The Iron Dollar is a fissure of contact betwee and porphyry and is 36 feet 8 inches wide. The gangue betw is mineralized. Average assay test on gangue, $16 to $18 while selected sample tests gave respectively $124.30 and $1 ton. The make-up of gangue (quartz) in this claim is iron qu carrying iron, copper, lead, silver, and gold. The company o adjacent claims, one a spur 6 feet wide, the other two on a fiss ing the Iron Dollar, and are each 20 feet wide, making a total 82 feet in width, which can be worked from one main shaft; body in the twelve claims, 198 feet in width.

"The company will concentrate all low-grade ore as soon centrator is erected."

GILPIN COUNTY.

The output of Gilpin County for the year 1884 has been v factory. There are now a dozen mines where the workings ha a depth of over 1000 feet, and at that depth the veins and ch

vein-filling have improved in comparison with that near the surface. The character of the ore is such that the cost of extracting the gold is never over $2 a ton, thus saving one of the greatest expenses attending the production of bullion.

The Colorado Central Railroad is reported to have shipped from Gilpin County during the year 14,973 tons of smelting ore, valued at $1,122,975, and 16,545 tons of tailings, valued at $413,525, a total shipment by that company of $1,536,500, which includes the value of the lead.

The shipments by express of retort and gulch gold during the year amounted to $971,225, which would made a total of $2,507,725 as the output of this county. Deducting $50,000 from this amount for the lead contained in the ore shipped by railroad would make the production something over $2,457,000.

The following statement shows the amount reported to have been received by the smelting works from this county:

Smelter.	Gold.	Silver.	Total.
Boston, Colo. smelting works	$683,000	$170,000	$853,000
Colorado Ore Sampling Company	53,408	106,816	160,224
Denver Public Sampling Company	100,000	20,365	120,365
Golden smelter	180,446	60,545	240,991
Omaha and Grant smelter	43,460	52,208	95,668
Matthews & Webb	9,353	6,211	15,564
Total	1,069,667	416,145	1,485,812

The above amount, $1,485,812, added to the amount reported to have been deposited at the Denver mint, about $1,020,000, would make the production about $2,500,000, of which possibly $2,000,000 was gold.

The Bobtail Mining Company has succeeded in reaching the Leavitt and U. P. R. veins, north of the main level, on the line of the westerly workings of the Bobtail Company. The ore from the latter vein is being trammed to the mill of the Bobtail Company, in Black Hawk, where it has thus far been treated at a small profit, the ore being of low grade.

At the Running lode about 75 men are employed in stoping out the reserves and doing some little development work. The total length of levels and drifts is about 2,500 feet. These levels have opened up about 4,000 fathoms of stoping ground. The mine is now yielding 200 tons of smelting ore, which varies in price from $25 to $75 per ton. The milling ore is kept in the mine and will be treated at Mr. Humphrey's concentrating mill as soon as spring opens.

The Cotton mine consists of three claims, the Cotton, Big Cotton, and East Cotton. On the Cotton the main shaft has been extended 35 feet. On the Big Cotton, from shaft No. 1, which is 148 feet in depth, has been run a level 174 feet, which connects with shaft No. 2, 125 feet deep. A shaft on the East Cotton is 75 feet deep, possessing a short level. This vein is parallel with and about 200 feet from the Bobtail. The ore from the two veins is similar both in quantity and quality.

The German Consolidated Mining and Milling Company owns several patented claims on Central City Hill, consisting of 715 linear feet on the German vein, 200 feet on the Hunter, 450 feet on the Hunter-Granite, 300 feet on the Richmond Hunter, 277 feet on the Bates Hunter, 700 feet on the Mossell, 1,000 feet on the Saxon, 1,500 feet on the Kitty, forming one continuous property 1,300 feet long and 300 feet wide. The company has made many improvements, among which is the placement

of a large improved engine, boiler, and hoister. Prior to March th property was under lease, and is reported to have produced in th months of January, February, and March $49,000 worth of bullio In March the present company was organized, and from that time the 31st of December the superintendent reports the production to ha been $166,641, which would make a total for the year of $215,641. Th company employed 125 men at the mines and their 50-stamp mill Black Hawk.

The Bull of the Woods has been worked but very little during th year, and no new developments have been made.

The Bonanza and Union Tunnel and Mining Company have conti ued work during the year. The Bonanza tunnel is about 1,200 feet i length and the Union about 750 feet. These are being lengthened b the aid of steam drills, compressors, and all modern appliances for con venient and expeditious development. The development on lodes cu by these tunnels, to date, is:

	Feet.
Maryland vein	750
Bonnell vein	200
Flood vein	50
Hyde vein	360
Kentucky vein	300
McCorkle vein	330
Cornish vein	85
White Star vein	26
Stull vein	40
Kettle vein	290
Como vein	150
Swede vein	90

The Central Union Mining Company, who are working the Bugher and Galena veins, on Central Hill, have a very promising showing in the bot tom of the main shaft of the Galena vein. The new steam-pump and boiler recently placed in the mine are working very satisfactorily. Some 22 miners are employed.

Nevada district.—The property of the Gunnell Consolidated Mining Company has not been worked so extensively as in former years. For the past six months nothing but development work has been done. The product of this property for the year is stated to have been $74,072.

The lessees of the Adeline mine, on Gunnell Hill, have sunk a shaft 240 feet deep. A winze is being sunk in the lower east level, and some back stoping is being done. The mill-dirt runs under stamps from 3½ to 4 ounces gold per cord.

The lessees of the Corydon are drifting east from the bottom of the main shaft and are in 80 feet. The west and opposite drift is in 10(feet. The ore passed through so far at this point is low grade. A winze is being sunk in the east 200-foot level about 150 feet from the shaft. A force of miners are also back-stoping in this level.

The Sayr and Teller tunnel and adit are now in 1,260 feet from thei entrance. Present work is confined to the development of a vein whicl was struck in the long adit some 260 feet from its heading. This give a fair showing.

The estimated depth from the surface of Quartz Hill now reached i about 320 feet.

The Columbia mine is working 100 feet below the surface, drifting an stoping. There are on the dumps about 20 tons of smelting ore.

In *Gregory mining district* the property of the United Gregory Gol Mining Company has been closed on account of the immense inflow o water, the only production being from ore on the dump. The lowes

workings are at a depth of nearly 1,000 feet. In shafts there is an aggregate of over 2,500 feet and in levels and winzes something over 4,300 feet.

The Prize-Sendenburgh mine, near the Gregory, has been worked quite extensively and the production has been large. The depth gained by the shaft is 675 feet. In levels there is an aggregate of 2,000 feet and in winzes about 350 feet.

The Roderick Dhu is working about 15 men constantly, pushing levels and sinking the shaft. Most of the work done during the year has been through barren ground. The shaft has gained a depth of 750 feet and aggregate of the levels will amount to over 2,000 feet. The ore is mostly low grade

On the Egyptian lode work has continued with considerable success. The shaft has reached a depth of nearly 800 feet and gives a better showing at that depth than in any of the upper workings. The property consists of about 2,290 linear feet.

The Denver Gold Company, Limited, have made many improvements in their mill and mine. In the former they have torn out twenty stamps and have put in new battery sills and foundations and will replace the old stamps. Other improvements are being added to the interior of the mill which will facilitate operations during the winter months. The water-way from the mine to the stamp mill is being arranged so as not to interfere with the tramming of ore to the mill in winter time. The main shaft on the Kansas, which was in an unsafe condition, has been retimbered in different places and a new slide for a bucket-way put in. The hoisting sheave is to be supplanted by a new one 6 feet in diameter and the same raised an additional 9 feet, giving it a total height above the collar of the shaft of 25 feet. The 500-foot level has been retimbered and a new T-rail track is being put in. The company keeps 40 stamps employed in crushing mill-dirt.

The Hubert Pool are cutting plats and establishing stations at the depth of 530 feet. The monthly output of ore from the mine is up to the former standard.

On the main Burroughs lode, south of the Kansas, four different pools are working along the vein, the westerly one known as the Ophir-National. The lessees are drifting near the bottom of the shaft, 750 feet, and have a body of ore which is better in quality than heretofore found. East of the Ophir-Burroughs the Connolly property is being worked and considerable mill-dirt and smelting ore taken out. On the Hyndman-Burroughs a light force of miners are drifting and stoping.

The steam plant of machinery and hoister formerly used by Mackey-O'Brien has been removed, and a Horn whim has taken its place. This motor has a capacity of hoisting 700 pounds from a depth of 500 feet. Two buckets are used, one horse doing the hoisting. The lessees are working in the 300, 400, and 500 foot levels. The mineral is carefully assorted in the various back stopes, and hoisted to the surface in sacks, ready for transportation to the smelters.

On the Gibson mine, easterly slope of Quartz Hill, a stationary engine and boiler have been placed over the deep shaft, also a friction hoister, all of which are inclosed by a building. The lessees of this mine are at present sinking. The vein is nearly perpendicular for a distance of 85 feet, at which point it gradually underlies to the north. Three eight-hour shifts of miners are engaged in sinking.

A double whip has been put on the Pocahontas mine, formerly known as the Register. The shaft sunk several years since is being cleaned out, with a view to sinking to greater depth.

At the Clark-Gardner and contiguous property on the Gardner n the old plant of machinery has been taken out and a new engine, bo and improved hoister placed over the main shaft. The building, wl has been in a dilapidated condition for a long time, has been repai and a new roof put on. They have been cleaning out and retimbe the shaft. A party of tributers are working the upper levels.

The Hawley-Gardner, west of Clark-Gardner, is again being de oped, after having been idle for some months.

The lessees of the Adelaide mine, on the east side of Pine street, taking out smelting ore, which runs $130 per ton for first class $40 for second class. Drifts are being run at a depth of 250 feet b ways from the shaft.

The lessees of the Nimrod have now piled up in their shaft-buildi awaiting transportation to the smelters, about 25 tons of smelting West of and adjoining the Nimrod a force of miners is at work on Pyrennees.

During the year 1884 the shaft of the California Gold Mining C pany attained a depth of 1,800 feet, and levels were pushed each v from this. The 1,500, 1,600, and 1,700 foot levels were extended to boundary line of their property, and back-stoping has been commenc During the year about 2,000 feet of levels and winzes were made, besi sinking an additional 100 feet on the shaft. The output has avera about 2,500 tons of ore per month. About 100 tons of this was sm ing ore, the balance free-milling ore, which is worked at the compa stamp-mills in Black Hawk, having the capacity of 100 stamps. I ployment is given to over 100 men, in addition to about 20 others wc ing on tribute.

The Gilpin County Mining Company, working on the Flack lc have produced considerable ore. The shaft is about 900 feet deep, this year's production has been from the 600 to 700 foot levels. M of the vein above the 600-foot level has been worked out. At 900 f depth levels are being run and back-stoping will soon commence.

The Pleasant View has not been worked during the year.

In *Eureka district* the property of the Rara Avis Gold and Sil Mining and Milling Company has been idle.

The R. H. D. lode has not been worked during the year, on accoun the death of the owner.

In *Russell district* the miners working in the Pewabic lode, wor by the Republic Mining Company, struck a body of ore said to be 2½ in width. The company gives employment to the usual numbe miners in the Iron mine, who keep their 25-stamp mill, at the mout Graham Gulch, busily engaged crushing mill-dirt.

The Delaware mine, in Lemon Gulch, has been leased.

The Watoga mine is improving as development progresses.

At the Saratoga Gold and Silver Mining Company's property, an the Silver Dollar, the Ayers, Leavenworth, the Prompt Pay, and mines of the Wyandotte Consolidated Mining Company nothing been done during the year.

In *Independent district* the Rollins Gold and Silver Mining Comp has continued work during the year. The Perigo has supplied mos the ore which has kept the 40-stamp mill belonging to the compan work.

This property is developed by over 800 feet of tunneling, 2,500 fee levels, and 900 feet of shafts. At present there are in the mine, read be stoped, blocks of ore the width of the vein and from 20 to 200 feet lo and from 50 to 75 feet deep. The production is limited only to the

pacity of the mills. Most of the ore is free milling. The smelting ore averages $45 per ton.

On the Daisy, which was idle most of the year, a force of men were recently put to work. The level started where the tunnel intersected the vein will be lengthened 100 feet before stoping begins.

In *Enterprise district* work has been continued on the Cyclops Silver Mining Company's property and employment given to about 30 men.

On the Fannie Toronto, Gilpin County, and Silver Plate some work has been done during the year.

GUNNISON COUNTY.

Mining is the chief industry of this county, but during the past year it has made but little advancement, the production of the mines approximating that of the previous year.

In addition to being a large producer of the precious metals, this county contains vast iron deposits, thought by some to be as extensive as those found in Pennsylvania, and also immense deposits of bituminous and anthracite coal. There are very many claims from which small quantities of ore have been produced by the usual assessment work, but most of the large producers have failed to come up to the promises of 1883, while it may be truthfully said that the resources of this county have been hardly encroached upon and the past year has not brought it prominently forth as a prosperous mining section.

The Forest Queen, heretofore one of our heaviest producers, has been comparatively idle, a concentrator for the reduction of the low-grade ores of that mine being in course of erection.

In the Ruby Chief mine the workings have been flooded with water.

In Poverty Gulch and Slate River country development work has been going steadily forward.

Shipments from the mines of the Elk Mountain country during the year are reported to have been as follows:

Name of mine.	Ore.	Value.
	Tons.	
Forest Queen	260	$36,400
W. M. Consolidated	20	2,000
Augusta	250	20,000
Domingo	70	4,500
Aspen Smelting Company, bullion	20	10,000
Aspen Smelting Company, ore	60	6,000
Montezuma	80	8,000
Little Crown	10	1,000
Excelsior	40	2,800
Sylvanite	40	25,000
Tam O'Shanter	20	1,000
Bradburn	10	1,000
Black Queen	80	5,900
Rose sampling works	80	10,000
Total output	1,040	133,600

Of the above some $25,000 were produced by mines of other counties, viz, the Montezuma and Tam O'Shanter, of Pitkin, and the Aspen, of Eagle.

The Rose sampler is reported to have handled 80 tons of ore, principally in small lots from the following claims: Milwaukee, Governor Tabor, Iron Duke, Silver Spruce, Buckeye, Excelsior, Iron King, Niagara, Maryland, Belle of Titusville, Ohio, Republic, Hudson, Michigan, Jacob, Strader, the Great Eastern, Little Crown, and Eureka.

One of the most encouraging features of the year was the settlement of the King-Eureka litigation and the subsequent working of both mines under *one management.*

A large force of men has been employed on the North Star, and the output was from 4 to 6 car-loads of ore per week.

In *Ruby district* little was done during the year, and the production and shipments have mostly been from the Forest Queen mine.

At the Forest Queen mine a concentrating mill was erected during the year. Trial runs have been successful, and it will prove a great auxiliary to the mine. The operations of the mine have been mostly suspended since April on account of the construction of the mill. The pay streak averages 28 inches; the mineral is a galena and zinc blende, carrying ruby and brittle silver.

On the Ruby Chief a tunnel has been run over 400 feet to free the mine from water, which for two years has stopped work.

The tunnel has reached and made connection with a drift in the old workings, which are 90 feet from the surface, and were reached by an upraise of 17 feet from the tunnel. The latter has a depth of 107 feet. The vein in width and character is similar to that of the Forest Queen.

The Venango has been worked by lessees, who have succeeded in making some shipments of ore which averaged $250 per ton. The ore is principally sulphuret, and unlike any other found in this camp. The mine is developed by about 1,500 feet of shafts, drifts, and tunnels.

The Bullion King has shipped some ore, but paid more attention to putting the mine in good order.

The Great Eastern, worked by lessees, has produced some rich ore.

In the Ella and Eureka the ore, though of low grade, is of a character that can be economically concentrated. The present developments consist of half a dozen shafts, the greatest depth gained being 60 feet, but ore is found throughout, and the company propose to cut the veins at a depth of 190 feet by a tunnel.

The Burlington has been allowed to remain idle. At the Augusta, in Poverty Gulch, the work on the tunnel has been prosecuted for about 300 feet, and which continuous on the vein and in ore, although no stoping was done. The course of the vein is northeast and southwest. At a distance of 300 feet in the tunnel a second tunnel was run from the Poverty Gulch side, a distance of 140 feet, connecting with the other tunnel. At 135 feet in from the mouth of the 300-foot tunnel a shaft was sunk 70 feet, proving the vein continuous and giving it a depth from the surface of 170 feet. The vein is nearly perpendicular, with both walls well defined and regular, though varying in width from 10 to 20 feet. It is more or less mineralized throughout. The ore from the vein on the surface is somewhat different from that found at any depth on the vein. The first car-load of ore ever shipped was surface ore, netting $76 per ton in gold and silver. The ore shipped since is reported to have given from 1 to 3 ounces in gold by car-load lots. One hundred and fifty tons of ore have been shipped, which netted $16,500. One hundred tons of ore recently sold from the dump to the Jumbo smelter brought $30 per ton. The altitude of this mine is 12,500 feet above sea-level, and it is distant from railroad about 8 miles. An electric battery is used for blasting. The character of the ore is ruby silver, black sulphuret, and gray copper, with a heavy lead ore for base metal; both walls are porphyry. Fourteen men are employed.

The Jacob Strader has a tunnel 230 feet long on the vein, giving it a depth of 160 feet from the surface. The vein is over 6 feet wide, with a pay streak on each wall, which on one side is 18 inches in width and on the other 10 inches. The ore is brittle and antimonial silver, tellurium, and silver glance, carrying very little lead. About 125 feet above this tunnel is another tunnel, 60 feet long, from which have been taken

ıut 3 car-loads of ore. There are also on the lower dump 5 or 6 car-ds of ore.

'he Domingo, in Poverty Gulch, is developed by a tunnel 300 feet the vein, giving it a depth of about 200 feet from the surface. A ıft 75 feet from the mouth of the tunnel is down 10 or 15 feet, and a l-run of ore taken therefrom gave 450 ounces of silver to the ton. ere are at present on the dump about 20 tons of ore. The character the ore is brittle and native silver, gray copper, lead, and iron; also eculiar metal known in some sections as mineral wool. A recent ike is reported in the Big Elephant claim. The claim is developed by adit of 54 feet and a tunnel of 25 feet. The vein for the first 30 feet s about 2½ feet in width, when it is reported to have suddenly widened a streak of ore 2 feet in width coming in on the foot-wall, making in breast of the drift 4½ feet of ore. Fifty pounds of average ore, taken m the 30-inch streak on the hanging wall, carried 1½ ounces of gold, ounces silver, and 28 per cent. lead.

n the vicinity of Crystal City, in the Black Queen, 15 feet from the face, a good ore-body was struck, carrying wire and antimonial silver. 'orce of 6 men were employed during the season and about 75 or 80 s of ore shipped, which returned about $6,000.

'he Belle of Titusville, which is being developed by drifting on the n, has widened out to 12 inches of pay mineral, showing fine wire and 'er glance. On the Hawkeye mine work is still progressing. The ıe is developed by two tunnels, one shaft, and two drifts, aggregating feet.

'he first or upper tunnel is 180 feet in depth, and from it a winze was k 90 feet. Another tunnel was driven to tap this shaft, which is ıut 400 feet in length. At the intersection of the shaft and tunnel drifts are run on the vein in opposite directions, each about 40 feet ength. The vein is not a large one, being about 12 inches in width, carrying mineral throughout.

'omiche district.—The production of the Carbonate King was consid-ble in lead but small in silver.

)n the Eureka a large force are at work extending the various drifts ougbout which ore is found.

)n the North Star mine a large force of men have been employed ougbout the year, and the output has been from 4 to 6 car-loads of per week.

'he North Star, Muldoon, Narrow Gauge, and No. 3 Straight belong he Galena Gulch Mining and Smelting Company.

'here are on the property numerous prospecting shafts, but the work-s are through a shaft 140 feet deep, and three inclines 110, 250, and 'eet, respectively. In levels there are about 500 feet.

Vork on the Legal Tender mine was suspended in December. The perty yielded during the past summer 21 car-loads of ore, which are orted to have netted the company, after paying for transportation, ·lting charges, &c., over $13,000.

everal promising claims have been worked in this section, notably Silver Trowel, Sedalia, Lehigh, Erie, Evening Star, North Star, roit, Parole, Phœnix, and the Lilly.

n *Horseshoe district* the Scottish Chief, Eagle, Mountain Boy, Police, 'er Belle, Eppe, and Stella claims are considered promising pros-ts.

hartz Creek district has not enjoyed a very lively season. The Way and Fairview mines have not been worked. On the Sultan, Sultana,

Porcupine, Eureka, Terrible, and Cumberland only assessment work has been done.

The Chronicle, on Sheep Mountain, was idle most of the year. In the Brittle Silver a new shaft has been sunk 65 feet in depth about 1,10(feet from the old workings, and a cross-cut tunnel 70 feet long intersect: the vein, where a drift 110 feet long cuts the bottom of this shaft. Ir these new workings some very rich ore has been found.

The vein is well defined, being 6 feet wide with a pay streak averagin; 12 inches in width, the character being galena, carrying silver glanc and brittle silver.

The Volunteer mine, located 3½ miles from Ohio City, has shippe two car-loads of ore to the Moffet smelter; a car load of the ore wil mill-run $106. There is a tunnel on the vein extending 300 feet, an below the tunnel is a shaft down 100 feet. At the bottom of the shaf the pay streak is 2½ feet in thickness and runs over $100 to the ton Twelve men are employed. On the Legal Tender considerable pros pecting has been done during the year. Two adit tunnels, one 145 fee and one 35 feet, were run. There are three shafts, 18, 15, and 12 fee deep, respectively, and two open cuts of 6 feet each.

The Napoleon, a new discovery, has during the latter half of the yea shipped considerable ore.

The vein is opened by a tunnel 50 feet long, with an incline at the breast of the tunnel 100 feet. At the bottom of the incline a level runs 74 feet, throughout which is found a 6-foot vein, the ore-body being continuous. Developments are being extended and ore extracted.

Tin Cup has had a little boom in placer mining and the veins have not received much attention, many of the best mines lying idle.

From the Gold Cup shipments have been regularly made. The Jimmy Mack has also been steadily worked. On most of the mines of Tin Cup district only assessment work has been done.

HINSDALE COUNTY.

Hinsdale County's output has fallen off considerably, yet not in proportion to that of some other counties. Its isolation from railroad communication, and various other drawbacks to mining, among which may be mentioned the short season (less than four months when mining can be prosecuted), together with the closing of the Crook's Mining and Smelting Company, the largest producer in the county, after but three months' production, have materially aided in causing the reduction in the yield of gold and silver. The mode of transportation is by wagons or by packing on burros for a distance of from 25 to 40 miles before railroad communications are reached, and the past season has made this mode of transportation more expensive on account of the heavy floods of the spring almost destroying the road-beds. The production is stated to be as follows:

Source of production.	Tons.	Value.
Crook's Mining and Smelting Company	1,227	$134,447
Frank Hough	700	52,500
Argenta Falls Silver Mining Company, limited (concentrates)	84	16,800
Vermont	63	4,095
Miners and Merchants' Bank	55	3,850
Mountain Chief	25	1,625
Wyoming	10	725
Henson Creek Reduction Company	16	720
Hannibal	3	600
Neoga	1	100
Total		204,891

At the Crook's Mining and Smelting Company's property the ore is
rth about $200 per ton. The smelter built for the purpose of reduc-
the ore of their mines did not prove a success, or rather they now
d it more advantageous to concentrate and ship to the reduction
rks at the foot-hills. Owing to some difficulties among themselves
company closed the mines in November and the property lies idle.
The Compromise has received only assessment work. The Big Ca-
o has been worked some, but there are no shipments to report, the ore
uiring concentrating before shipping. The Ocean Wave still remains
e.

On *Engineer Mountain* many claims are being worked, while some of
best developed mines have been allowed to remain idle. Amongst
latter are the Palmetto, Ruby Queen, First National, and Polar Star.
e Frank Hough mine has been one of the main factors in swelling
output of the county. The workings are through a perpendicular
aftwhose depth is 300 feet, from which numerous cross-cuts and drifts
run. The largest ore-bodies are found to the southwest of the shaft,
obably 150 feet distant. To the northeast of the shaft the explora-
ns have not been very extensive and the true character of the vein is
yet fully demonstrated. A winze has lately been sunk 30 feet far-
r, and a new level is being run to exploit the mine and ascertain the
ation and probable extent of the ore-body above.

The Wyoming, near Rose's Cabin, has been shipping some ore, the
racter of which is a galena and copper that carries 75 ounces of sil-
per ton. The development consists of three shafts. Those at the
reme north and south ends of the claim are 15 and 20 feet in depth,
pectively. The shaft in the center is 100 feet deep. From this are
drifts; the upper one, at a depth of 50 feet, is run 50 feet north. At
epth of 85 feet another level is run both ways on the vein. These are
ng rapidly extended as the shaft is being sunk deeper. Through-
the vein will average 4 feet, with mineral streak 2 feet in width.
ore has been stoped and the shipment is the ore extracted in the
rse of developing.

The Capital City Silver Mining Company has done little or nothing
ond working the assessment, the claims belonging to this company
ng the Lily, Capital City, and Capital City Extension, all of which
e a fair amount of development, which discloses a vein 3 feet wide
good concentrating ore. The same thing might be said of the Silver
rd, Silver Chord Extension, Moro No. 1, and Moro No. 2, and also
he Independence, on Galena Mountain.

The Illinois Boy, the property of the White Cross Mining and Milling
npany, is being developed by shaft and tunnel; the former is 75 feet
p, the latter 90 feet in length. These workings disclose a vein 3 feet
le, of good concentrating ore. Developments will be continued until
vein is thoroughly explored.

The Vermont has been extensively worked and about 150 tons of ore
racted. The shaft has been extended to 175 feet in depth. The de-
lopments disclose good bodies of ore, which still remains in the stopes.
ork was suspended on this property in December. It is reported
t about 1,000 tons of ore are now blocked and can be extracted with
t a small amount of labor.

But a small amount of work has been done on the Black Wonder
nsolidated Mining Company's properties. At Camp Carson but little
s been done to develop the numerous prospects, though the Hamilton
s shipped some ore. In the *Lake district*, the Belle of the West, now
tter known as the Argenta Falls Silver Mining Company, has been

the most active producer. This is a well-developed mine, possessing in shafts, levels, and winzes nearly 2,000 feet. The mineral is scattered throughout the vein, which is from 2 to 4 feet wide and is easily and economically concentrated. This company has in connection with the mine a concentrator, which has been constantly running since August, and the ore after passing through this becomes marketable, averaging 90 ounces of silver per ton.

The Belle of the East has continued idle during the year. On the Mountain Chief some development work has been done and some ore shipped. It is the intention to work 5 men during the winter, putting the property in shape for future production.

The Golden Fleece has received some developments, the character of which is in deeper workings. This is one of the remarkable veins of Colorado, situated as it is miles away from anything of the kind and in the midst of silver-bearing lodes, and the only one of the kind found in this vicinity. Owing to litigation, the necessary annual assessment work was not performed and a year ago some miners jumped the claim. These new owners were not long in finding the vein, and are now pushing the developments and putting the property once more in a condition to produce.

A force is at work on the Plutarch. In the lower level, now in over 250 feet, the vein, about 18 inches, shows 1 foot of quartz, carrying several streaks of high-grade gray copper; these streaks run from 1 to 2½ inches in width, with gangue matter between.

The Neoga and Gladiator have aided to swell the output of the county in 1884. In the Neoga a shaft is now down 42 feet, with a 12 to 15 inch pay streak. At a depth of 30 feet mineral commenced coming in, which has steadily increased with depth. The character of the ore is brittle, native, and ruby silver, black sulphurets, and chlorides, which are reported to run 400 ounces of silver. The Gladiator has been idle for a year. A tunnel was run in 1877, the vein opened, and a short drift run. The work of development has been started during the year from the breast of the tunnel and the ore-body has increased to 14 inches. The ore is reported to be "bismuth-silver glance," that is, bismuth with silver glance, and can not be treated by any works in this country.

LAKE COUNTY.

The production of this county, the largest producer of silver and lead in the world, shows a decline during the year from that of 1883. This reduction has taken place not only in the quantity of the precious metals obtained from its mines, but also in the value of the total production, occasioned by the falling market for silver and the low price of lead.

The depressed condition of the market for these metals lessened both the profits from mining and the output of the mines, producers preferring in many cases to leave their ore in the mines awaiting a more favorable market.

The developments during the last year in lime formations were attended with results sufficiently favorable to encourage similar explorations in other properties. The large producers have immense bodies of ore in sight and new producers are being constantly added to the list. The original producers of Leadville of 1879, which a year ago were pronounced exhausted, have been steadily producing during the year.

The "Leadville Herald" gives the production as follows:

Leadville's bullion statement.

[Production of the Leadville smelters and mills during 1884.]

Name of works.	Bullion.	Contents.			Value.
		Lead.	Silver.	Gold.	
	Tons.	*Tons.*	*Ounces.*	*Ounces.*	
Arkansas Valley smelter	9,026	8,978	1,404,157	5,764	$2,315,286
American smelter	8,050	8,000	775,000	5,500	1,500,000
Harrison reduction works	5,995	5,962	935,124	1,434	1,492,542
La Plata smelter	5,252	5,187	1,568,668	2,466	2,153,505
Fryer Hill smelter	4,584	4,544	617,955	3,412	885,606
Manville smelter	2,659	2,625	420,000	1,050	676,415
Ore, Antioch, &c	.....	.....	.....	3,000	60,000
Total	35,566	35,296	5,720,904	22,626	9,083,443

Leadville ore shipments during 1884.

[Report of ore produced by Leadville mines and shipped to Denver, Pueblo, Cañon City, and elsewhere for treatment.]

Treatment.	Ore.	Contents.		Value.
		Lead.	Silver.	
	Tons.	*Tons.*	*Ounces.*	
American smelter	14,000	2,000	120,000	$280,000
Arkansas Valley smelter	10,705	1,686	257,422	406,285
Eddy & James	49,848	18,459	791,625	2,300,874
Colonel Sellers	4,500	942	189,000	300,000
Colorado and Utah works	13,749	.....	.....	166,895
Other shippers	*20,000	.....	.....	240,000
Total	112,805	23,087	1,358,047	3,754,054

*Principally iron.

The "Democrat" recapitulates as follows:

Name of works.	Bullion.	Lead.	Silver.	Gold.
	Tons.	*Tons.*	*Ounces.*	*Ounces.*
Arkansas Valley	9,026	8,978	1,404,156	5,764
American	8,000	7,968	775,000	5,500
La Plata	5,252	5,187	1,568,688	2,466
Harrison	5,995	5,962	935,124	1,434
Fryer Hill	4,549	4,523	617,955	3,412
Manville	2,659	2,638	511,801	1,000
Total	35,481	35,256	5,812,724	19,576

The value of the above is computed as follows:

,256 tons of lead, at $3.65 per 100	$2,573,688
312,724 ounces silver, at $1.10	6,393,996
,576 ounces gold, at $20	391,520
Total metallic product of smelters	9,259,204
ıe Omaha and Grant sampler received 53,000 tons of ore, containing 10,691 tons of lead, valued at $3.65	780,443
15,549 ounces of silver, valued at $1.10	1,337,104
	2,117,547
72 ounces gold, at $20	125,440
	2,242,987
this one-tenth was transferred to Leadville smelters	224,299
Value of shipments to Denver	2,018,688

The gold in the ore came largely from the Lilian Mining Com

The Arkansas Valley sampler bought for outside parties 9,637 tons of ore, dry weight, containing 1,686.6 tons of lead, valued at $3.65 .....
257,421.6 ounces silver, at $1.10 .....

The Colorado Smelting Company, of Pueblo, received, dry weight, 7,485 tons of ore, containing 1,024 tons of metallic lead, valued at $3.65.....
394,057 ounces silver, valued at $1.10.....

About 20,000 tons of iron were shipped to other part of the valley and Utah, valued at $5.....
About 1,000 tons of lead ore to Utah, valued at .....
Our Lake County placers produced in gold about .....
The stamp-mills are estimated to have produced in gold.....
And in silver.....

The Pueblo Smelting and Refining Company received its shi from Leadville chiefly through the Arkansas sampler.

Following is a recapitulation of the various sources of mine duction:

Product of smelters.....	$9
Shipments by Omaha and Grant.....	2
Shipments by Arkansas sampler.....	
Direct shipments to Colorado Smelting Company	
Shipments of iron ore	
Shipments of lead ore to Utah.....	
Placer product.....	
Product of mills	
Total	12

The following is the total lead tonnage:

By Leadville smelters.....	
Shipped by Omaha and Grant, less 10 per cent. which remained in Leadville, 10,691.....	
Shipped by Arkansas sampler	
Shipped to Utah, 25 per cent. of 1,000 tons.....	
Total tons	

The above figures prove that the silver grade has somewhat inc and that the ore value is largely improved by the increase of gold t while the lead product is far below that of last year.

The Leadville smelters secured during the year, as formerly, t est portion of the product of the camp.

The Harrison, with a considerable stock of silicious and refracto on hand, limited its purchases to desirable smelting ores. It in its roasting capacity by adding a new set of kilns.

The Arkansas Valley smelter, with its sampling works, handle ore than any other in Leadville.

The business of the La Plata Mining and Smelting Company and its furnaces were not very busy, but considerable sulphuret treated at its works.

The furnaces of the American Mining and Smelting Compan been kept supplied by its own and mines which it controls. It als shipments to its smelter in Cañon City, the Royal Gorge.

The Fryer Hill Smelting Company had two furnaces in blast year, and in the latter part three.

The Manville smelter had three furnaces going the latter part of the year and has built extensive roasting works.

The Omaha and Grant sampling works have not handled the usual quantity of ore.

The Colorado and Utah sampler limited its purchase principally to iron ores for shipment to Utah.

The Oro and Antioch mills were supplied with free-milling ores by the mines on Printer Boy Hill, the increased output of which also caused the erection of a new mill by the Lilian Mining Company.

Fryer Hill, the great bonanza field of the past, still retains its productive importance. The Chrysolite, Little Pittsburg, Little Chief, Climax, Amie, and Dunkin, the big producers of the past, still continue to send forth their riches. While some have been irregular in shipments, explorations have been continued on all.

The official report of the treasurer of the Chrysolite Company for the fiscal year ending October 8, 1884, has recently been made public. During the year 3,143 tons of ore mined by the company produced $108,974.77, and 1,123 tons mined by lesses $13,317.42, a total of $122,292.19, to which are added sundry other receipts, carrying the total up to $127,482.43. The expenses amounted to $95,994.18, of which $42,095.57 were for labor, $6,289.25 for timber, $2,119.02 for ore-hauling, $16,031.48 for coal, and $26,193.90 for contracts.

In addition to the above expenses $4,000 were paid as an installment on the purchase of the mill, $6,546.66 for labor and supplies for the mill, and $1,162.56 for grading for the railroad branch. The cash on hand October 8, 1884, was stated to be $187,546.27, against $192,866.14 at the same time in 1883.

The general manager reports that during the year 2,420 feet of drifts, 472 of winzes and rises, and 4,605 feet of shafts were driven, a total to date of 33,565 feet. The ore sales aggregated 4,424 tons gross weight, or 3,532 tons net weight, containing 145,300 ounces of silver and 897,143 pounds of lead, for which the company received $134,086.65. Particular attention, during the first part of the year, was given to ascertaining the value of the second and third bodies of iron. The Colorado Chief incline was driven to within 205 feet of the Roberts shaft, when an important pump failed and work was temporarily abandoned. The incline has since remained idle. Explorations were made on the Little Chief line and connections made with the old workings. This resulted in finding several small bodies of good ore, which were chiefly mined under the Campbell contract. Chrysolite shaft VI was sunk to a depth of 286 feet. After cutting the quartzite work was stopped. No iron of importance was found. Little Eva shaft VI, situated in K 32 immediately in front of the office, was sunk from the surface to a depth of 114 feet, and connected with the main second level. No ore was encountered. Fairview shafts III and IV were sunk from the surface, the first to a depth of 61 feet, the other to 96 feet. Iron was found in both. In the Kit Carson workings (under the location of that name), at the west end of the second level, 217 feet of drifts, 40 feet of uprises, and 41 feet of winzes were driven, without obtaining any ore. At All Right shaft II 390 feet of drifting were done, and these workings were connected with Kit Carson shaft II, without finding ore. By means of these Kit Carson and All Right workings the northwestern part of the property was explored with unfavorable results.

The total cost of explorations is given as $37,409.31, of which $21,634.10 were spent on the Colorado Chief incline.

A small concentrating mill was built, which is now running and re-

turning a satisfactory profit, and an amalgamating mill was leased, to work the low-grade material on the dumps by the well-known pan-amalgamation process. For concentrating the fine material, carrying both silver and lead, which is obtained from underground and the dumps, six hutches have been built and connected to the sampling-mill engine. From these have been shipped 330.5 tons of ore and received $13,569.85, at a total expense (including construction) of $6,294.89, leaving a profit of $7,275.06. At present the mill can only be run through the six clement months of the year. No crushing is done. The "hard iron" is saved for amalgamation. It was found by amalgamating about 1,200 tons of dump ore, containing 10 ounces of silver to the ton, that 48 per cent. of the silver could be saved. The company therefore leased, with option to purchase, the Leadville Gold and Silver mill of this place for a term of three months, beginning September 1. It is now run on the company's dump ores.

The Little Chief Mining Company has been worked during the year, and paid during that time two dividends of $20,000 each. The production was 2,674 tons of ore, which, in addition to paying two dividends, has left a surplus in their treasury.

The operations of the Little Pittsburg Mining Company during the year were chiefly directed toward the prospecting of the large iron-ore chute in the northern part of the Little Pittsburg. A new lead started from shaft No. 6, under this ore, struck water, which will need to be drained. Leases of dumps and old workings and other parts worked by the company have produced during the past year 7,200 tons of ore, for which was received $80,000—mill returns. The southern part of the premises of this company was prospected last year to some extent, but without favorable results.

The Amie & Deer Lodge has also been a producer of no small dimensions, 1,100 tons being the product for 1884, the value of which was expended in pushing development and explorations, which to date are about 8,500 feet.

The Dunkin Mining Company continued their production in a quiet way. Over 2,000 tons of ore were sold during the year, that netted quite a sum to the company. The total aggregate of development is something like 8,500 feet.

The Climax has been quite actively worked, and with good results. About 1,500 tons of ore were extracted and sold, and about 900 feet of new development work done, making in all about 4,600 feet. The value of the ore in this property varies considerably, but a fair average would be about $32 per ton. This mine is worked through six shafts and inclines; the surface improvements are of the best and requisite for all necessary use.

The Matchless mine has been worked continually and the output has been equal to that of last year. But a small amount of development was made, except in the southern portion, which has disclosed ore-bodies almost equal to those found in the central and northern portions of this property. The total amount of development is about 10,000 feet. During 1884 about 5,400 tons of ore were produced, mostly chloride of silver, which ran $50 and upwards per ton.

Yankee Hill remains in about the same condition as at the beginning of 1884. Many claims have been worked to the extent of the annual assessment, and the producing mines of a year ago have continued shipments quite regularly, the most notable being the Small Hopes Mining Company, which paid during the year fourteen dividends, amounting to $850,000; the largest amount paid by any mining company in the

State. This satisfactory record is due to the extensive developments in the Forest City. During the year another shaft was located upon the course of the chloride-ore chute toward the corner formed by the Denver City and the Result line, the latter claim belonging also to the Small Hopes Company. The Kerens shaft is located about 65 feet from the Denver City line and about east of the Denman. This has been made the pivot shaft, from which a series of drifts are being run in four directions. The workings which produced last year's output lie to the west. Toward the south the two drifts farthest west show porphyry mixed with ore in the breasts. The north and south drifts nearest and parallel to the Denver City line are also in ore. With the exception of the east drift, from the Kerens shaft to the Denver City line, there are no workings whatever of the Forest City on the Denver City line. There are four efficient plants upon the Forest City, of which three are on this ore-chute. The mine employs 130 men.

The New Pittsburg Mining Company shipped during the year about 6,000 tons of ore and made about 7,000 feet of development. Almost the entire property is worked by lessees, who, as a rule, are doing well.

On the northern part of the Big Pittsburg ore was struck by using the Stonewall Jackson shaft and drifting thence into the Pittsburg. A new shaft about 170 feet deep, with a 75-foot drift and a 200-foot 35-degree incline to the east, was sunk by other lessees. The ore is a heavy lead sand and carbonate, running high in lead and low in silver. The ore has been followed down on its dip to within a short distance of the Hibernia line. The body dipping thus towards it is in places from 9 to 12 feet thick. The leasers have produced largely—from 15 to 30 tons a day each.

Carbonate Hill has been pouring forth its riches without interruption and, I believe, without any signs of exhaustion.

The Morning Star Mining Company has confined its operations during the year to development work and the extraction of ore from the McHarg shaft. The explorations of late have led to the discovery of a low-grade and dry ore, underlaid in part by marketable iron, of which shipments have recently been made. The minerals occur irregularly in streaks and bunches all through the contact matter. The extraction of the ore is greatly facilitated by chutes, through which it falls into the McHarg drift aforementioned. The lead and dry ores from these workings run 40 ounces in silver and upwards. The lower 400-foot level of the McHarg has been extended in mineral, mostly lead sand, high in lead but low in silver, some distance toward the north, and connection has been made at one point with the Henriett, an adjoining mine on the north. In the Henriett an incline has been driven nearly to the Maid of Erin line, mostly in the same contact and similar ore, 15 feet thick, with occasional pockets of high-grade argentiferous galena. The Morning Star Company shipped during the year 15,477 tons of ore, of the value of $173,638, exclusively from the upper contact.

Prospecting work has been continued from the upper shaft of the Evening Star mine. The ore now being extracted consists of low-grade lead and marketable iron ore. The old workings are leased and producing but little as yet. The shipments of the Evening Star mine during the year are reported to have been 3,380 tons, valued at $43,143.

The Big Chief Mining Company have made some extensive development during the year. The shaft has reached a depth of about 605 feet. At 468 feet the shaft pierced the regular porphyry limestone contact and disclosed some very fine sand ore. After working out the ore in the

immediate vicinity, the shaft was sunk deeper and levels driven, open ing new ore-bodies to the eastward. Iron was encountered which re turned 6 ounces in silver to the ton, and at 9 feet below the limeston fine galena and sand carbonates were met with. The shaft was sun about 20 inches into this ore-body, when the increased flow of wate enforced a suspension of work.

The ore extracted last year by the Adams Mining Company, by wa of the Clontarf, came mainly from stopes to the east of the Clontarf drif The central part of the Clontarf-Brookland and the grounds east of th Brookland drift contain the largest ore-bodies opened up. Both th north and south drifts of the Brookland have ore in the breast. Th north end of the Moyamensing, also the property of the Adams Minin Company, has already yielded a large amount of valuable chloride or of the same character as that of the Forest City. The output of th company from the Clontarf-Brookland alone was 11,000 tons, nettin about $220,000, of which $82,500 were paid in dividends.

The Agassiz has shipped during the year about 3,000 tons of or averaging from 25 to 40 ounces in silver, a fair aggregate of 30.

Iron Hill still maintains its position as the largest ore producer o the many hills around Leadville.

The Terrible Mining Company produced from their two claims, th Terrible and Adelaide, over 150 tons of ore. The property is worke under lease, five different parties being at work on it at present.

The claims of the Argentine Mining Company produced last yea 3,580 tons of ore, containing 94,493 ounces of silver, 363 ounces of gold and 533 tons of lead, which cost for treatment $32,642 and yielde $91,600. The ore ran 31 ounces of silver, 0.12 ounce of gold, and 17. per cent. of lead.

The operations of the Iron Silver Mining Company have been directe toward the exploration of the Colonel Sellers sulphide-ore chute an the cleaning up of old stopes by lessees. Although the company ha remained the foremost shipper of carbonates, it has not been success ful in a financial point of view.

With the exception of the work on the Moyer shaft, and a limite amount of work in the Iron Silver, nearly all the old mines of the com pany, such as the Bull's Eye, Codfish Balls, Lime, Kaiserin, Stone an Daisy, Dome and Rock, have been worked by lessees the larger part o the year and have yielded quite handsomely. The low price of lead however, greatly reduced the receipts therefor.

During the past year the A. Y. mine has not been an extensiv shipper, but the development of the sulphide-ore chute of the mine ha continued without interruption. The silver contents of the A. Y. sul phides are above the average of the carbonate ores of this section. I the sulphide chute are extensive bodies of ore running 25 per cent. lea 22 per cent. of zinc, and 14 ounces of silver. This sulphide-ore chut lies to the southeast of the mine. The mine has several spacious an well-arranged plants.

At the Colonel Sellers, shaft No. 1 has been sunk to a depth of 40 feet, shaft No. 2 to about 500 feet, shaft No. 3, 326 feet, and shaft No 4, 215 feet deep. At shafts Nos. 1 and 2 the mineral is said to be fro 40 to 45 feet thick; at No. 3, 20 feet, and the far northwest workings, 1 feet. In the triangle formed by shafts 1, 2, and 3 there is a large a cumulation of ore. From this body the bulk of the best ore is produce The ore in the winze connecting with the drift from shaft No. 4, in th gulch, runs about 45 per cent. in lead, but lower in silver than the othe *In the central* part ofthe mine, from which most of the shipments hav

been made, the average of all the lots shipped has been about 45 ounces silver, 27 per cent. lead, and 18 per cent. zinc. At this mine there are four shafts and three levels. The lowest level starts from shaft No. 2, at a depth of 400 feet, with 100 feet of dump below. This level runs under the ore-chute, permitting the economical extraction of ore from about two-thirds of the mine to the north and east. The two other levels above are most of the way in ore and connected with each other by numerous winzes and upraises. Shafts Nos. 1 and 2 are connected by the first level. All four shafts are connected underground. The vein is said to show an average thickness of 40 feet. All four shafts are covered by spacious plants. Shaft No. 1 has a 25 horse-power Akron hoister and air-compressor, used in drilling; shaft No. 2 has the largest plant on the mine, with a 40 horse-power Akron hoister and a 10-inch Cornish pump; shaft No. 3 has a 20-horse hoister, and shaft No. 4 a 20-horse hoister and an 8-inch Cornish pump.

The mine shipped in 1884 about 13,400 tons. Four thousand two hundred tons have been shipped to the Colorado Smelting Company, at Pueblo; the balance was shipped to Leadville smelters, chiefly to those which have made the treatment of sulphide ores a special business by the erection of roasters—the Harrison reduction works, the Arkansas Valley, and the Manville smelter.

On the Minnie a shaft was sunk to the depth of 275 feet. Drifts were started in various directions in ore, partly low grade. Toward the west a drift was run, mostly in lime, without discovering valuable mineral. North and east of the shaft fair ore was encountered. The best, however, was struck south of the shaft, where from a small stope, since April last year, $180,000 worth of ore is said to have been taken. The present output goes mainly to the Manville smelter. The cage has been removed from the shaft and the latter is now being sunk deeper for a level under the south ore-chute.

At the Ruby the ore-chute is opened a considerable distance to the westward of the shaft. At the intersection of the level with the chute a drift follows on the ore-body for 80 feet, showing ore of variable grade for the entire distance. The width or thickness of the ore-body is still unknown, but sufficient work has been done to prove it to possess unusual strength. The average of a lot of ore in bins was shown by assay to be 24 ounces in silver, 0.15 of an ounce in gold, and 24 per cent. in lead.

The Great O'Sullivan is located between the Oro City and the property of the Emmet Mining Company. The shaft is about 100 feet above the bed of the gulch and is 150 feet deep. In the present main workings the ore varies from 15 to 30 inches, with occasional larger pockets. The ore is of a uniform good grade. The mine has a good plant, including a steam-hoister, well-protected ore-bins, assay office, and other buildings. There are employed from 25 to 27 men. The ore output varies from 15 to 20 tons. The production for 1884 is said to have amounted to $65,000.

The property of the La Plata Mining and Smelting Company is reported to have produced in 1884 15,060 tons of ore.

The Emmet Mining Company produced last year 2,478 tons of ore, for which were received $127,741, or an average of $57.55 per ton.

The Florence mine shipped 1,133 tons of ore during the year. It and eral adjacent mines were consolidated and incorporated in a stock pany, known as the Lilian Mining Company of Leadville. The con- a tion now embraces about 100 acres.

The Pilot mine is opened by a tunnel 600 feet in length, and has lately cut quite a streak of ore containing gold.

On *Breeze Hill* the only properties that have been actively worked are the Little Prince and Little Johnnie. The Little Johnnie has been shipping regularly. The 115-foot level follows on the vein to the southward for about 187 feet, ending in ore of fair grade. The mineral carries silver, gold, and lead, in quantities that leave a fair profit above the cost of mining and smelting. The 166-foot level, running in the same direction, is in 201 feet and shows ore in a number of places.

The Leadville smelter of the American Company contains four large furnaces, possessing a capacity of 150 tons of ore per diem. The furnace charges being rather light in lead ores, the daily base-bullion product of the four furnaces averages 20 tons. The base bullion contains from 90 to 100 ounces in silver to the ton, and 1½ ounces in gold.

The company is also operating the Royal Gorge smelter, at Cañon City, which contains two furnaces, with an ore capacity per twenty-four hours of 70 tons, yielding about 15 tons of base bullion daily. The company secured the Cañon City establishment exclusively for the reduction of Gunnison and San Juan ores. The requisite amount of lead ore for these works will be supplied by the Eureka, one of the company's mines situated in Gunnison County. The mineral consists of galena and sulphate and carbonate of lead, ranging in value from 70 to 80 ounces in silver to the ton and carrying 50 to 70 per cent. in lead. The dry ores for the Cañon City works are purchased throughout the various mining districts in Southwestern Colorado.

The Little Ellen mine, the most prominent of the company's mines, situated on Little Ellen Hill, is shipping 50 to 60 tons a day, employing about 30 men. The developments of the mine along the incline now exceed over 1,100 feet. Water has been encountered in the mine and two large steam-pumps were used, but without success; therefore, a large air-compressor has been purchased for that purpose.

The output of the Little Chief mine, on Battle Mountain, is nearly as great, so far as tonnage is concerned, as that of the Little Ellen, although employing but about two-thirds of the force, namely, 20 men. The ore obtained from the Little Chief mine is a most desirable smelting material, carrying a great deal of lead and a large excess of iron over silica. The ore contains on an average about four-tenths of an ounce in gold to the ton, while the Little Ellen ores range from 1 to 1½ ounces in gold to the ton.

The Chicago Smelting and Refining Company, which is an auxiliary to the American Mining and Smelting Company, is in successful operation. It possesses a capacity for desilverizing and refining lead of 120 tons in twenty-four hours. About one-half of the furnaces in the establishment are at present employed and some tons of base-bullion handled daily. Of the bullion treated, 20 tons are supplied by the American smelter, at Leadville, 15 tons by Royal Gorge smelter, at Cañon City, and 25 tons are purchased from other smelting works.

At the head of Big Evans Gulch is the New York mine. Considerable work was done on this property during the early part of 1884, but, owing to the continued deep snows during the winter months, it was impossible to ship the ore as fast as extracted, and between 100 and 200 tons of fine ore accumulated before shipment began. Since the roads were opened the output has been quite regular, and the ore-bodies now exposed indicate a prosperous future.

Near the New York mine is the Little Willie, on which work was recently commenced.

At the Daisy mine a large shaft is being sunk and other permanent improvements are being made.

The placer ground in Lake County possessing value is as follows: California Gulch, length 5 miles, width 100 to 600 feet; Iowa Gulch, length 4 miles, width 50 to 200 feet; moraines west of Leadville containing patches of good pay, embracing about 25 square miles; Arkansas River Valley, length 20 miles, width 100 feet to one-half mile; West Fork of the Arkansas, length 8 miles, width 25 to 500 feet; Lake Fork Creek, length 3 miles, width about 200 feet; Colorado and Little Frying Pan Gulches, length 2½ miles, width 40 to 125 feet; Half-Moon Gulch and its branches, 7 miles in length and 50 to 200 feet in width; Twin Lakes Creek, its tributaries and surrounding moraines, Georgia, Thompson, Empire, Union, and a dozen other minor gulches, containing many acres of good ground.

The following list of mines in Lake County shows the reported development to date, and the number of tons of ore produced in 1884:

Leadville mines.

Name of mine.	Location.	Acreage.	Character of ore.	Capital stock.		Dividends.			Development work.	Number of shafts and inclines.	Engines.		Ore produced during 1884.
				Number of shares.	Par value.	Date of last.	Amount per share.	Total.			Number.	Aggregate power.	
									Feet.				*Tons.*
Adams Mining Company	Carbonate Hill	15	Lead carbonate	150,000	$10 00	Dec., 1884	$0 10	$15,000	3,500	2	4	200	11,273
Ætna	do	10	Carbonate and chloride	2,500	100 00				5,500	5	1	10	500
Amie Mining Company	Fryer Hill	9	Lead carbonate and iron	500,000	10 00	Oct., 1883	05	25,000	8,500	5	3	50	1,100
Argentine	Iron Hill	....	Carbonate and chloride	2,500	100 00				1,700	6	2	30	2,000
Agassiz	Carbonate Hill	25	do	50,000	50 00				1,200	4	2	60	.....
Allegheny Company	Yankee Hill	35	Iron	80,000	10 00				1,000	4	2	60	.....
A. Y	Iron Hill	18	Carbonate, galena, and zinc	(†)					8,800	3	3	100	6,000
Argent	Rock Hill	8	Lead carbonate	500,000	10 00				4,500	2	1	15	4,000
Antioch	Breece Hill	(*)	Gold and silver quartz	(†)					200	1	1	12	200
Boreel	Iron Hill	7	Iron and chloride						2,500				200
Breece Iron	Breece Hill	30	Hematite iron	200,000	25 00	Feb., 1880	01	2,000	4,500	2	1	15	.....
Big Chief	Carbonate Hill	20	Lead carbonate	(†)					2,750	2	2	60	1,200
Brian Boru	Printer Boy Hill	8	Lead carbonate and gold						2,000	5	1	10	500
Buckeye	Fryer Hill	8	Carbonate and galena						1,500	3	1	25	75
Carbonate Hill	Carbonate Hill	10	Lead carbonate	400,000	10 00	July, 1883	10	40,000	8,500	3	1	25	1,200
Catalpa	do	10	do	300,000	10 00	June, 1884	10	30,000	1,200	3	3	50	1,985
Chrysolite Company	Fryer Hill	60	do	200,000	50 00	Dec. 20, 1884	25	50,000	(‡)	10	4	150	2,557
Climax	do	8	Lead and iron	200,000	10 00	Aug., 1880	30	60,000	4,500	6	2	25	1,500
Crescent	Carbonate Hill	10	Lead carbonate and iron	300,000	10 00				7,000	1	1	20	900
Colonel Sellers	Iron Hill	16	Silver, lead, and zinc	(†)					7,000	4	3	60	12,500
Crown Point	Rock Hill	14	Lead carbonate						8,500	5	2	40	7,500
Denver City	Yankee Hill	12	Iron and chloride	500,000	10 00				10,000	1	1	120	2,500
Dunkin	Fryer Hill	10	Carbonate and galena	200,000	25 00	Sept. 15, 1884	05	25,000	8,500	3	3	80	2,000
Dolphin	do	7	Iron and chloride	(†)					2,500	1	1	15	1,500
Dyer	Dyer Mountain	10	Galena	10,000	10 00				2,500	2	....	.....	1,000
Double Decker	Yankee Hill	10	Gold-bearing quartz	(†)					1,400	2	....	.....	250
Emmet Company	Rock Hill	60	Lead carbonate	500,000	10 00								2,478
Evening Star	Carbonate Hill	6	do	50,000	10 00	Oct., 1883	50	25,000	1,200	4	4	120	3,338
Forpaugh	Fryer Hill	10	Iron-carrying silver	80,000	10 00				1,000	2	2	65	400
Iroquois Mining Company	Carbonate Hill	16	Carbonate and chloride	250,000	20 00	May, 1881	10	25,000	6,500	4	2	85	1,200
Iron Silver Company	Iron Hill	70	Carbonate and galena	500,000	20·00	Jan., 1884	20	100,000	10,000	12	7	400	50,000
Iron Hill Consolidated	do	25	do	250,000	10 00				7,000				1,400
Iowa Gulch	Yankee Hill	10	Chloride	300,000	10 00				600	2			
Great O'Sullivan	Rock Hill	10	Lead carbonate	(†)					7,000	6			2,800
Hibernia Group	Yankee Hill	12	Carbonate and chloride					30,000	5,000	4	3	45	3,200
Henriett	Carbonate Hill	10	Carbonate and galena						6,000	4	3	45	7,500

La Plata	California Gulch	20	do	200,000	10 00	Oct., 1882	30	60,000	25,000	3	2	50	15,000
Long & Derry	Long and Derry Hill	60	do	(†)					5,000	4			
Little Corinne	Mosquito Mountain	10	Gold quartz	500,000	1 00				900	1			50
Little Ellen	Little Ellen Hill	35	Lead carbonate carrying gold	35,000	100 00				1,800	2	1	110	4,000
Little Silver	Fryer Hill	5½	Lead carbonate and chloride						1,500	1	2	90	300
Matchless	do	10	Carbonate and horn silver	(†)					10,000	3	2	30	5,304
Morning Starr	Carbonate Hill	26	Lead carbonate	100,000	10 00	July, 1884	25	25,000	12,000	8	6	100	13,476
Maid of Erin	do	8	Lead carbonate and chloride	(†)					4,000	3	1	30	14,000
Mike & Star	Breece Hill	53	Copper, silver, and gold	200,000	5 00				3,000	2	2	75	
New Pittsburg	Yankee and Fryer Hills	38	Lead carbonate	200,000	100 00				9,000	8	6	90	6,029
Nellie S	Printer Boy Hill	4	Lead carbonate and gold	(†)					3,200	4	2	60	1,500
R. E. Lee	Fryer Hill	12	Iron carrying chloride	500,000	10 00				9,000	15	3	150	4,000
Small Hopes	Yankee Hill	35	do	250,000	20 00	Dec., 1884	25	62,500	6,000	5	5	300	15,000
Silver Cord	Iron Hill	65	Lead carbonate carrying gold	448,000	10 00	Nov., 1883	10	44,800	6,750	5	5	300	2,000
Smuggler Consolidated	do	12	Lead carbonate	50,000	10 00								
Shields	Frying Pan Gulch	(*)	Sulphide carrying gold	5,000	100 00				2,500	3	1	40	200
Saint Louis	Breece Hill	(*)	Gold and silver quartz						1,800	4	1	20	
Terrible	Iron Hill	17	Carbonate and chloride	100,000	1.25				3,500	5	2	50	1,000
Venture	Frying Pan Gulch	(*)	Quartz, silver sulphide	(†)					3,800	2	1	15	700
Vining	Rock Hill		Lead and silver						2,400	1	1	15	1,100
Weldon	Carbonate Hill	8½	Iron carbonate and chloride	(†)									

* Fissure. † Private. ‡ 9.1 miles.

LA PLATA COUNTY.

Six thousand dollars will cover the production of La Plata Cou and it is difficult to ascertain the real cause for its small product With few exceptions, there has been but little development in the m of this county during 1884.

OURAY COUNTY.

The output of Ouray County for 1884 shows an increase of abou per cent. over the preceding year. One of the greatest drawback Ouray and vicinity is the lack of economical means of transporta as the great bulk of mineral, after paying the cost of transporting 35 to 50 miles in wagons, and the smelting charges, only a small p remains for the producer. Hence on numerous properties are fo large dumps of ore which frequently averages $50 per ton.

Red Mountain district.—The output of this section has been ma from the following mines: Yankee Girl, National Belle, Genesee, J son, Orphan Boy, Guston, Sailor Boy, Carbonate King, Denver, Trea Trove, Grand Prize, Maud S., Guadalupe, Galena Lion, and Candi

The two leading mines, the Yankee Girl and the National Belle producing some 40 tons of ore per day, and the former is reported by newspapers of Ouray to have produced last year over $600,000 wor bullion, but these figures are doubtless exaggerated.

In the main shaft two levels have been started, one in 25 and other 20 feet, in the latter of which has been found a very high g of ore, coming in pockets containing in some cases as high as 4 tons level has been started in shaft No. 2, and is now in some 60 feet, said, in bismuth silver. Nearly 600 feet of development work has done, most of which has been in ore. The National Belle has been ducing, and some hundred tons of ore are on the dump.

A force of men are at work on the Genesee, which adjoins the Yan Girl, and some 50 tons of low-grade ore have been extracted. The s is down about 20 feet, and the main tunnel is in 440 feet, with a c cut of 165 feet.

The Orphan Boy adjoins the Yankee Girl, and although only a 50 feet of development has been done, considerable high-grade ore been produced, of which some hundred tons are on the dump. A nel to connect these two mines has been started.

On the Treasure Trove, work on the tunnel has been steadily p cuted and it is now in 120 feet. The ore has not as yet been reach

On the Brooklyn a body of chloride ore is reported to have opened up. The present development consists of a shaft 70 feet d

It is said that a strike of rich ore has been made in the Mono, and some 200 sacks of ore a day are being shipped to the Swansea re tion works.

The Enterprise has a tunnel 175 feet in length, with about 160 fe shafting. Some 25 tons of ore were shipped during the year.

On the Grand Prize the cross-cut started last fall has been exte 135 feet. When the lode was reached, some hundred feet under surface, it is said that the ore-body as cut showed an average widt 4 feet of soft carbonates, with a 2-foot pay streak. A 40 foot drift run on it, a shaft sunk, and some ore has been produced which is to assay 49 ounces silver and 56 per cent. lead to the ton.

On the Saratoga the tunnel has been extended 230 feet during year, and at a distance of 100 feet a cross-cut has been run some 12 f

to the left. Quite a force of men are employed and a large quantity of ore has been sacked for shipment.

A shaft has been sunk on the Vanderbilt 45 feet. At the end of the 50-foot tunnel of the Tin Cup a shaft has been sunk 15 feet, and nearly 100 tons of carbonate ore are on the dump awaiting shipment.

A contract has been let to run a 225 foot cross-cut tunnel on the Silver Gray, one of the old locations of the camp. An ore-body has been exposed in the Hidden Treasure consisting of galena in a partially carbonized condition; but little development has been done on it.

The shaft on the Candice is now down 12 feet and said to show good ore.

In *Sneffles district* the Virginius, Monongahela, and Sidney are said to have produced during the year: The Virginius, about 365 tons (some of which ran over 300 ounces in silver); the Monongahela, 315 tons; and the Sidney, 258 tons.

Some development work has been done on the property of the Agnes Mining Company in Imogene Basin, consisting of a shaft 230 feet deep and two levels 170 feet and 100 feet, respectively. The mine is well supplied with facilities for producing and working ore, consisting of a steam-hoister at the shaft and good ladder-ways and cars in the levels, the mill being connected with the ore-chute by a covered tramway. The ore is fed into a Blake crusher, then run into Cornish rolls, and thence into revolving screens, four in number. The fine material is treated on the Frue vanner. The Agnes mill is run by steam-power, the water being brought a distance of over 17,00 feet by a flume.

About 80 tons of ore have been taken out of the Hancock in 80 feet of development.

In *Uncompahgre district* considerable development work was done, but, on account of the low grade of the ore, but few mines shipped. The shippers are said to have been the Rose, Golden Gate, Big Pigeon, Gold Finch, and Little Pigeon.

On the Mameluke, located at Mount Hayden, two drifts have been run, each 80 feet in length and over 7 feet in height. About 6 tons of ore have been produced.

The Dallas Placer Mining Company was organized in 1883, to work extensive gravel deposits supposed to exist on the Uncompahgre River, at a point below the mouth of the Dallas. A hydraulic elevator capable of handling 2,000 cubic yards of gravel per day, with a pressure of 300 feet, has been erected and work was commenced in October of 1883. The company are actively at work, although with what success is not known.

In *Bear Creek district* the leading properties are the Belle of Ouray, which has some thousand feet of development; the Union, with 1,900 feet; and others, ranging from 50 to 250 feet.

Camp Paquin is a new district, situated a mile from the Ouray and Montrose wagon-road, in which many locations have been made, but principally only assessment work done.

On the Portland drifts have been run from 60 to 150 feet, and on the Bona Hensel some developments have been made which show argentiferous galena.

PARK COUNTY.

The production of Park County for 1884 is not as large as that of 1883, but the reports of mine-owners show that the mines are generally in a better condition.

The placers of 1884 have increased their yield, employing mostly Chi-

nese labor and without modern improvements. Two new stamp-m have been employed in the *Horseshoe district.*

The Moose mine, on *Mount Bloss*, the discovery of which, in 1881, c ated some excitement, after lying idle a number of years has been ag worked by lessees. The vein is quite wide, the mineral pockety l rich.

The property of the Fannie Barrett Mining Association has recei only assessment work during the year. The Hall and Brunk Sil Mining Company have been extracting considerable ore from the D Varden mine. Developments are constantly progressing and the sh ments of ore have been regular. The vein is from 8 to 10 feet betw walls, with a pay streak of mineral that will average 30 inches in wid The ore, which carries galena, gray copper, zinc blende, iron and c per pyrites will average 90 ounces of silver per ton. In shafts, inclir and levels there is an aggregate of 2,500 feet of developments. cepting at the Moose and Dolly Varden but little work has been d in *Buckskin district.*

The Earnest and Little Earnest, the Wyandotte, Red Lyon, Little R Everlasting, Silver Dust, Fannie Morris, Eureka, Silver Friend, Wonderful have shipped no ore this year.

In *Mosquito district* a small force was worked in the spring on claims of the London Mining Company, but nothing of importance been accomplished. The mine closed, owing to litigation.

The Nestor, located about 5 miles below the London, is being worl on a lease, and ore is being extracted that carries one-half to 3 oun gold. The mill, which is reached by a trestle-work some 150 feet from mouth of the property, is supplied with pay mineral enough to test capacity. The predominating matter is a free-milling gold quartz.

The New York mine, just west of the London, has materially aide swelling the output of the county. It is worked by lessees, who h shipped since July, on an average, two car-loads of ore per week.

The same might be said of the U. P. and K. P. mines, on which tensive developments have been made of late and which are now be pushed. The ore is low grade but abundant. The U. P. is develo by five tunnels. No. 1 is 210 feet long; No. 2, 170 feet; No. 3, 100 f No. 4, 60 feet; and No. 5 is 48 feet. These are connected by shafts winzes, the aggregate of which amount to nearly 1,000 feet. On the P. a tunnel of 150 feet was run in addition to former developments. a point where this tunnel intersected the vein a shaft was sunk 25 on a large body of lead ore. A force will be employed during the ter exploring this, the average value of which is $18 per ton.

The Boaz Mining Company have been doing little or nothing dur the year. The five properties included in the company are all goo

On the Bonanza King a drift has been run 60 feet from the first sh at a depth of 115 feet, and another 22 feet from a second shaft at a de of 45 feet. These workings disclose a vein 7 feet wide with a pay str 30 inches, the mineral being copper and iron pyrites and averaging f $75 to $180 per ton in gold and silver. Water in the levels has stop work in the mine, and it is proposed, in order to save the expens pumping, to run a cross-cut tunnel and cut the vein at a depth of ab 250 feet.

The Truman is being put in order by lessees. The vein is quite w and the mineral scattered throughout, which is easily concentrated is worth about $100 per ton. On this property is a shaft 72 feet. tunnel 318 feet long cuts the vein at a depth of 127 feet.

The Western and Hock Hocking, two well-developed mines, h *been producing* some ore.

In *Horseshoe district* the Last Chance mine has been attracting considerable attention. The company has executed a contract with responsible parties for delivery to the mill now in course of construction of 50 tons of ore from the mine daily for the next twelve months, and twelve teams are now engaged in this work.

The Sovereign mine, at Alma, has over a mile of tunnels and shafts. The vein varies in width from 3 to 12 feet and the high-grade ore will run over $100 per ton. There is one tunnel 1,000 feet in, another 600, a third 200, a fourth 400 feet; one shaft 90 feet, a second 275, a third 145. The country rock is granite. The pay streak is from 22 to 50 inches wide, and the ore is quartz, with copper and iron pyrites, said to run from $30 to $40 in gold and some silver. Some telluride has been found. In addition to the quartz lodes the company has over 2,500 acres of placer ground. It controls all of the placer ground and the water of the Platte River for over 6 miles. About 100 men are employed.

The Wheeler, just above Montgomery, is being systematically developed. Shifts are working night and day, running levels and pushing the tunnel. The ore is free milling, averaging $45 in gold per ton.

The Atlantic is not a very extensively developed mine, but during the year has shipped considerable ore that has paid well. The vein is 8 feet in width and the mineral streak about 2 feet. The developments consist of a shaft 160 feet deep. The yield during the year was from levels 30 feet from the surface, which extend 50 feet each way from the shaft.

The Copper Bonanza is but a prospect, the deepest shaft being only 18 feet, yet the owner has shipped 10 tons of ore, working it alone. This is free-milling ore and will average $50 per ton.

The Peerless and Peerless Maude, owned by the Peerless Mining Company, are developed by three shafts on the vein, each about 100 feet deep, and a tunnel 300 feet in length. The ore is a galena that carries on an average 60 ounces per ton. Some shipments were made during 1884, and preparations are being made for extensive working as soon as the season opens.

PITKIN COUNTY.

Although the reports of the producers do not show any large increase, this county is reported to have made considerable development of its mining industries during the year.

Most of the mines are but prospects, and while the local newspapers give very glowing accounts, no statistics have been received which show considerable production or justify an estimate of more than $50,000 during the year.

On *Aspen Mountain* the principal claims are the Spar, Washington, Vallejo, Emma, Aspen, Chloride, Durant, and Grand Opening. The ores are refractory.

There are also some properties which contain large quantities of low-grade ore, notably the Smuggler and Montezuma, which, however, are not on this mountain.

There is a smelter at the town of Aspen of 28 tons capacity, which is at present being enlarged and roasters are being added. The ores received at it show about 7 per cent. zinc and 13 per cent. baryta, making a very refractory combination, costing some $28 per ton to treat.

The Smuggler and the adjoining mines, the Mollie Gibson and Lone Pine, show the same vein. In the latter a considerable force of persons has been worked during the summer, and the property has shipped some ore.

On the east of Aspen are the One Thousand and One and Chance lodes, through which, from the similarity of formation, it is thought the same vein trends.

The J. C. Johnson, located on Smuggler Mountain, an extension of the Smuggler mine, has some thousand feet of development done upon it, over 400 of which have been done since the first of last October. The present workings are now in the tunnel, about 150 feet below the original shaft. The tunnel runs into the mountain in an easterly direction for some 200 feet, when it turns northeast nearly 100.

The last 150 feet are said to be on the contact. The product is shipped to the Arkansas Valley smelter, at Leadville. Some 20 men are employed.

At the Aspen mine the main shaft is down to a depth of 225 feet, and at the bottom of it is a drift running 70 feet nearly west, and another running 80 feet due west. It is reported that some 80 men have been employed at this property and that some 20 tons of ore a day are being shipped to Leadville.

Some 75 men are said to be employed at the Spar mine, the present workings being confined to the incline on Washington shaft No. 2. The developments are by stoping, and the Aspen Sun and Times state that some 2,000 tons of ore have been extracted and shipped during the year.

The Camp Bird group, near Tourtelotte Park, consists of six claims and ore-mill site, namely, the Camp Bird, Iowa Chief, Edison, Silver Star, Grand View, and Burro, and has produced some ore during the year.

The Morning and Evening Star mines are thought to be good prospects, and are now being tunneled, having been penetrated 200 feet in length, but no production reported.

At the New York mine a 100-foot shaft has been sunk and a vein which is said to carry considerable silver has been struck.

The New York No. 2, adjoining the former, has a 60-foot shaft and a 20-foot drift, showing a spar of gray copper and galena.

On Richmond Hill the Richmond is the most prominent claim, having a 75-foot shaft with a 40-foot drift, from which some mineral has been produced. Adjoining is the Iron and the Little Annie, the former of which has a shaft of 60 feet with a 150-foot tunnel, and the latter a shaft of 40 feet with a 230-foot tunnel.

There are an immense number of claims on this hill, many of which are said to be in mineral and which have some small development, but as none of them have been producers, it is not thought best to recapitulate them.

In Conundrum Gulch a large number of claims are located, prominent among which are the Silver Chief, Helena, Iron Cross, Pride of the West, and Denmark, on all of which some development has been done, in most cases only assessment work.

RIO GRANDE COUNTY.

The mining of this county is confined to a comparatively small area, mostly on South Mountain and in the southwestern part. The veins are found at an elevation of about 11,500 feet and the ore when extracted is conveyed by tramways to the mills at the foot of this mountain. The character of the country rock is principally porphyry, trachyte, or volcanic lava, with vein-fillings of jasper quartz. The veins are irregular, running in various directions. The quartz is of a dark ebony color and contains fine gold. During 1884 the production fell off somewhat.

The Aztec Company owns considerable property, the principal being the Aztec mine, a claim 50 by 1,500 feet, the oldest location in the camp and originally known as the Summit lode. The ore is a decomposed jasper, carrying black sulphurets, free gold, and tellurium. The mine has shipped ore for over two years that has averaged over $200 per ton. The Aztec mine has three shafts and two tunnels and is better developed than any mine on that portion of South Mountain.

The Iowa and Colorado Mining Company have been idle for a long time. This company has nineteen patented claims, with little work done upon them aside from that necessary to secure a patent. The main Iowa tunnel, started to cut the Parole lead, is in about 1,300 feet. This property was sold at trustee's sale and was bought in trust for the bondholders, for $67,838.15, being the amount of all their bonds, with interest to date of sale and costs and expenses of sale.

On the property of the Golconda Company three leads have been struck in tunnel No. 1. In tunnel No. 2 fourteen blind leads have been struck, and the tunnel has not yet accomplished its design.

The report of the Golconda Company shows the indebtedness of the company to be $106,000.

The mill-run of 1884 was far better than was anticipated. The ore was taken principally from the middle drift and stopes, mining southeasterly from the shaft, which connects the two tunnel levels, and was taken out of a width of about 6 feet. This ore ran over $18 per ton by raw amalgamation, and produced gold .816 fine at the United States mint at Denver, which returned to the company, in cash, from this run, $2,800.43. Besides this ore, a small lot of about 4 tons was run in one battery of 5 stamps, from the vein under the ore-shaft of No. 1 tunnel. This ore ran nearly, if not quite, as well as that from the middle drift, and the proceeds are included in the amount above named. Tests of ore from other parts of the mine were made, all showing up reasonably well. Returns from the Omaha and the Grand smelter, at Denver, show the concentrates to contain, per ton, 5 ounces of silver and 40 ounces of gold.

The Little Annie Consolidated Mining and Milling Company own about 70 acres in claims and mill-sites.

There will be considerable work done at *Summitville* during the present winter, it now being the intention of the Annie Company to run their mine and mill to the full capacity during the cold months. The mine has been cleaned out and placed in shape for working and employs a small force of miners. The ore is crushed and loaded into a bucket tramway at the mine, and carried to the tramway-house on top of the mill, where the ore is dumped into a series of chutes that carry it to any of the twelve batteries of 5 stamps each. Here, through self-feeders, the rock is pounded up and washed out over the battery plates, which catch a large per cent. of the gold, attracted by quicksilver. The tailings are carried on to the vanner-house, where sixteen Frue vanners are working and form the closing process in catching the gold. The per cent. of gold saved by this company is calculated at about 90. From the mill and vanner-house the amalgam is taken to the retort-house, where the quicksilver is extracted and a gold brick cast.

The Annie Company is at present the only company in the camp running a mill, though considerable work is done in the mines by other parties. The Annie mill has a 125-horse power Corliss engine. The ore of the Annie Company is being handled at a cost of about $3 per ton. The gold will average .900 fine and is worth $19 per ounce.

SAGUACHE COUNTY.

The mining industry of this county cannot claim to be prosperou The output of this year shows no increase over that of 1883, nor an developments of importance on the various mines. The large irrigatin canals constructed through the San Luis Valley, of which a part is i Saguache County, have turned many mine-owners of Kerber Creel from mining to agricultural pursuits, and the capital which would hav been expended in exploring the veins has been used in farming. Th veins throughout this region are, as a general rule, quite wide and hav well-defined walls; yet the mineral is not only scattered, but so refrac ory that it is not in very great demand by the smelters. Some few ex ceptions may be made, but as a general thing little or no lead is co tained in the ore. The ore, if economically concentrated, will often ru 600 to 1,000 ounces of silver per ton.

The old smelter at Bonanza has been idle, owing to its inability t properly treat the ores found here; but during the last few month some capitalists have remodeled the United States mill, at Parkville, int a smelter.

The Columbia remained idle most of the year, although a force o men have been at work putting the mine in good shape.

The Mohawk and Mars received only assessment work during th year.

On the United States the shaft is 160 feet deep, from which are ru two levels, one at a depth of 80 feet, 120 feet in length; the other level at a depth of 160 feet, is 60 feet in length.

The India possesses a shaft 160 feet deep and two levels that aggre gate nearly 200 feet in length. The veins in both these claims are wid and the mineral found scattered throughout. Average value of mineral $50 per ton. Both have been idle during the year.

The Albert, in Enterprise Gulch, has produced some ore during th year, and a small force has been at work considerable of the time.

The Exchequer, near the town of Exchequer, began work in June since which time shipments have been quite regular of large quantitie of fine concentrating ore. The mineral is largely associated with gra copper.

Among the most prominent prospects in this vicinity are the Bonanz Revenue, Keystone, Rawley, Antero, and Arkansas mines. The latter i being opened by an adit tunnel now 161 feet in length. A shaft 75 fee deep connects with the tunnel at a point where an incline has bee commenced, which will be driven for 100 feet. The vein is 6 feet wid showing an ore streak of 16 inches, composed of gray copper and coppe pyrites, with an average value of $125 per ton. Irregular shipment were made during 1884.

The Four Per Cent and Little Ann remained idle most of the yea Both mines are now being put in order.

The Belmont mine has produced and marketed considerable ore, an quite a large force has been constantly at work extending the develo ments. The Great Republic is on the same vein as the Belmont. Th vein is well defined, averaging 5 feet in width; the mineral of high grad assaying 100 ounces of silver and upwards, A shaft has been sunk 12 feet, from which three levels were started, the longest being but 50 fee

The Empress Josephine possesses the most extensive development and produced the greatest amount of mineral of any mine in the county In the deep workings of the claim the ore is said to have changed fro silver to gold bearing. The ore encountered was a form of telluride an

was found near cross-vein No. 2, in the second level. It lies in the casing immediately adjacent to the main pay streak and is 5 inches in thickness, associated with quartz. The telluride occurs in streaks through the quartz, varying from one-fourth to one inch in thickness, and is also scattered in pockets through the vein in a crystallized form. The work now being done consists almost entirely in extending the east drifts at the different levels. An air-shaft has been sunk from the surface 150 feet from the shaft and connected with the stope in the first level. By means of the winze connection an admirable current of air has been established through the second level.

Work has again been resumed in the first level. A streak of nearly 14 inches is exposed which carries large quantities of antimonial silver. The second level has reached a distance of 335 feet from the shaft. The rich telluride streak still continues, associated with 5 inches of quartz. In the third level the most favorable showing is at present disclosed. The pay streak, about 15 feet back from the breast, shows nearly 4 feet of ore, principally galena, associated with gray copper, assays of the best running from $150 to $300 per ton. The breast now carries a large streak of iron pyrites associated with brittle silver, yielding good returns.

The Boss Mammoth has been worked considerably during the year and some high-grade ore shipped. The Townsend has received extensive developments. A shaft was sunk a few years ago. In April last a new tunnel was started, which has proved a success. The vein was cut and the mineral disclosed averages $150 per ton. Drifts are now being run both ways on the vein.

It is the intention of the owners of the Rawley mine to continue the tunnel which cuts the Townsend vein, as the same when continued will cut the Rawley at a depth of nearly 250 feet.

The Paragon mine has shipped but a small amount of ore, which was concentrated very successfully with the hand-jigs in use at the Josephine. The headings obtained yielded $45 per ton, consisting of galena and pyrites. The shaft, sunk to a depth of 40 feet from the surface, showed a 14-inch streak of blende and galena that ran $35 per ton.

The Eureka, upon the same vein as the Paragon, shows the same body of ore. The cross-cut tunnel run to intersect the vein at a distance of 200 feet from the mouth was intended to furnish a means of working both these properties. A large amount of ore is now stored at the mine.

SAN JUAN COUNTY.

Mining operations in this county during the past year have been very satisfactory, and the developments made have been very gratifying to the owners of the various properties. Considerable dead work has been accomplished, with satisfactory results, and many mines have in this way been placed in such condition as to justify the expectation of their becoming producers in the immediate future. The very heavy and continuous fall of snow during the first four months of the year, occasioning a blockade on the railroad lasting nearly three months, was necessarily a serious drawback to mining industries. This was followed by very heavy thaws and rains in the month of June, which, by swelling the creeks in the lower portion of the county and washing away bridges and tracks, also proved a very heavy drawback to the shipment of ore and bullion.

Since the pleasant season opened the output of the mines has been steady, and shipments have been limited only to the capacity of the rail-

road to furnish the necessary transportation, the only means of exit being from Silverton, from which is also shipped the product of the mines of San Juan and San Miguel Counties, and the product of the mines of Red Mountain district, in Ouray.

There is reason to look upon the past year's mining operations in San Juan County with satisfaction. Developments have been of the most gratifying nature. A vast amount of dead work has been done, with good results, and a number of properties placed in position for future production.

The North Star mine was worked almost continuously during the year, except a few weeks in August, since which time the mine has been shipping ore without interruption. A cross-cut tunnel 1,245 feet in length has been run, which at a depth of 450 feet cuts the vein, the width of which is 28 inches, of solid galena and gray copper ore. Levels have been run on this vein each way from the end of the tunnel, and winzes made to connect with the upper working, so that the outlet is now through the tunnel. There are five levels or drifts in the mine, viz: No. 1 is 90 feet from surface, with length of 185 feet; No. 2 is 70 feet below No. 1, with length of 600 feet; No. 3 is 35 feet below No. 2, with length of 750 feet; No. 4 is 110 feet below No. 3, with length of 400 feet; No. 5 is 140 feet below No. 4, with length of 100 feet. The vein is about 8 feet, between well-defined walls, the mineral streak averaging 30 inches. The product of the mine for 1884 was 1,100 tons, nearly all of which came from one stope. Twenty-two men are employed in drifting and sinking on the vein.

At the Belcher a force has been employed in driving a cross-cut tunnel, which in December reached its destination, and is nearly 1,500 feet long, cutting the vein at a depth of 600 feet. The vein where cut shows very strong, and against the hanging wall 18 inches of solid mineral. The ore runs 65 ounces silver and from 30 to 40 per cent. lead. In the upper workings of this property the average of the ore was about $50 per ton, thus showing at great depth an increase of 50 per cent. A considerable quantity of ore has been shipped.

The Empire belongs to the Mellville Mining and Production Company and has been steadily worked. After nearly 500 feet of cross-cut tunneling the ore-body was reached. The ore was first encountered on the foot-wall, and was shown to be galena and gray copper, with a width of 2½ feet. Three feet of mineralized gangue was then cut through and a streak of mineral 2½ feet in thickness found against the hanging wall. The vein is 8 feet in width, was cut at a depth of 240 feet from the surface, showing 5 feet of mineral. The mineral streak against the hanging wall is of the same character as that against the foot-wall, but apparently carries a larger quantity of gray copper.

The Stadacoda, on Sultan, is a short claim lying between the Jennie Parker and the Empire. A cross-cut of 75 feet has been run, cutting the vein about 40 feet below the surface. Drifting on this level amounts to about 100 feet and is all the way in a strong vein of excellent ore. From the heading of the tunnel a shaft has been sunk 40 feet, from which about 70 feet of drifts have been run, showing a stronger vein than the tunnel level. A small amount of stoping has been done. Seventy tons of ore have been milled, which returned 70 ounces of silver to the ton. Fifty tons are ready for shipment; also about 40 tons of second-class ore, which will average about 40 ounces to the ton.

The Cleveland has been almost a regular producer and the developments have disclosed great improvement in the vein and vein-filling.

Some work has been done on the cross-cut tunnel, but not sufficient to extend to the vein.

The French Boys' Silver Mining Company has employed a force of about 20 men in pushing development work and extracting ore. The aggregate number of feet in tunnels and levels is 1,100.

The Lackawanna group of mines has received considerable development work. The group consists of nine full claims and one-half claim, and there are at present 1,300 feet of development on the property. Tunnel No. 1, a cross-cut, is now in 360 feet. This tunnel has already cross-cut four leads. Tunnel lode No. 1, the first vein cross-cut, is 1½ feet between walls and is a well-defined vein of quartz and mineral; upon this vein a drift of 20 feet has been run. Tunnel lode No. 2 was cross-cut about 90 feet from the mouth of the tunnel and shows a 4-foot vein, upon which a drift of 10 feet has been run, showing mineral of good quality, consisting of galena and gray copper. The J. B. Smith lode was cross-cut by tunnel No. 1 at a distance of 112 feet from the mouth of the tunnel, and upon this vein 220 feet have been run in an easterly direction, the pay-streak mineral being continuous the entire distance, averaging 10 inches in width; thus 220 feet of stoping ground are now opened on this level of the J. B. Smith vein. West from the cross-cut on the same vein a drift has been run 19 feet, at the end of which a shaft has been sunk to the depth of 60 feet. This shaft shows the same streak of mineral encountered in the east drift to continue down its entire depth.

The J. B. Smith vein is 4½ feet between walls. One hundred feet from the J. B. Smith, tunnel lode No. 3 was cross-cut, and upon this vein a drift 110 feet has been driven in an easterly direction, showing a vein of quartz and mineral 4 feet in width. At a distance of 50 feet in advance of the present face of the tunnel the Crain lode will be cross-cut. Tunnel No. 2 is in 325 feet. On the same vein, 150 feet in, a cross-cut was run 40 feet which cut tunnel No. 3. Two hundred feet further another cross-cut tapped the vein, exposing a pay streak of 28 inches. There are on the dump about 50 tons of ore, which were taken out in cross-cutting the lodes.

Claims were located in Cunningham Gulch in 1873, about one year previous to the time the rights of the Indians were extinguished. In 1874 a large number of prospectors visited the gulch and made additional claims. Development demonstrated that the gulch abounded in strong veins which needed only depth to place them upon a handsomely paying basis.

Cunningham contains some prominent properties, among which might be mentioned the Highland Mary, the Philadelphia, the Kansas City, the Green Mountain, the Independence, the International, the Little Ada, and the Pride of the West, the latter being the property on which the most satisfactory development has been done.

The company's properties consist of eight lode claims and three mill sites, grouped. Three thousand feet are owned on the main or Pride of the West vein. The croppings, consisting of quartz carrying streaks of galena in some places and streaks of copper in others, can be traced the entire distance. The vein averages 30 feet in width and is one of the strongest anywhere in the gulch. The total development on the property is in the neighborhood of 1,600 feet, with about 700 feet in mineral. Development consists in part of four tunnels. In prosecuting work on tunnel No. 1 six distinct veins were cut in reaching its present length of 670 feet, all of which show through the quartz streaks of solid galena, so disposed as to render concentration easy. It will, before reaching the

main vein, be necessary to extend this tunnel 100 feet, and, when completed, it will probably be utilized as one of the main outlets. Tunnel No. 2, about 1,200 feet south of No. 1, in 90 feet, will probably not reach the vein for 700 feet. One hundred feet further south and about 900 feet higher is tunnel No. 3, which cuts the vein at a distance of 100 feet. The vein at this point has a width of 28 feet, and discloses a streak of mineralized gangue, lying between two compact streaks of mineral consisting of galena interspersed with gray copper. It is reported that 1,500 tons of the mineral taken from the workings of which tunnel No. 3 is the outlet have been shipped, and some 500 tons of good concentrating ore still remain on the dump. The average value of the ore shipped was $65 per ton, running 45 per cent. lead, 47 ounces silver, and a small amount of gold per ton. Tunnel No. 4 has been run on the upper portion of the vein a distance of 50 feet, showing the same character of mineral as that of tunnel No. 3. Drifts on the vein to the north and south have been started; the former is now in 100 feet and the latter 275 feet. Mineral has also been removed from a stope 90 feet in length and about 10 feet in height. A shaft 60 feet deep has been sunk from tunnel No. 3, with three drifts from the bottom of it, amounting to about 100 feet in length.

Red Mountain district.—That portion of Red Mountain district lying in San Juan County has not been prolific in its output. In the vicinity of Chattanooga not much was done in development, and in the vicinity of Red Mountain City litigation has caused the closing of many properties.

The Molas Queen has a 105-foot shaft at a point where the first work was done on the mine, and two levels, one at 60 feet depth, in 120 feet, the other at 100 feet depth in 160 feet. The vein-matter where this shaft was sunk is 8 feet in width, consisting of quartz and decomposed granite. The mineral or pay streak averages some 12 inches in width, and in the 60-foot level is a galena and gray copper, while in the 100-foot level liberal quantities of ruby silver occur. The shaft at the present time has between 30 and 40 feet of water in it, and some 12 men are employed in removing it. When this is accomplished, sinking will be resumed on the shaft; and when completed, drifts will be run in opposite directions on the vein, opening a large amount of stoping ground.

On the Sampson No. 1 and No. 2 development work has been continued, but no production is reported, although a large quantity of ore is on the dump.

The Mystery is a new location, having been made last spring. The development work consists of about 200 feet in four levels and a 40-foot shaft. A large force of men are employed and about 5 tons of ore are taken out and shipped daily.

On the property of the Promontory Mining Company extensive developments have been made, and its future prospects for becoming a producing mine are excellent. On their property on Jones's Mountain the company has for some time been doing dead work in the shape of a tunnel. It was started three years since, for the purpose of developing five claims belonging to the company, and is now in a distance of about 900 feet. During the past year a small force of men has been steadily employed.

At the Old Lot, formerly a large producer, a working force of 30 men is employed on dead work and in removing ore. About 5 tons of ore per day are placed in the ore-house.

The Silver Monarch mine is situated on the western side of Poughkeepsie Gulch, upon what is considered the Old Lot lode. The mine is

admirably situated, having a good trail to it; also a fine supply of water, sufficient for any machinery which may be required for working the mine. A considerable amount of practical development has been done in cross-cutting and drifting on the lode. In the drifts and stopes there is a fine showing of high-grade ore. Ore from this property has been shipped to various points, from which good returns have been realized. There are large quantities of various grades on the dump, which, after sorting, will be shipped to Silverton. Eight men are employed and work is being pushed. In the north drift a large body of ore is exposed, about 50 per cent. of which is galena, with gray copper, pyrites of copper and iron.

The San Juan Chief is producing a large quantity of good ore. The ore from this mine varies in value, some of it running as high as several hundred dollars to the ton.

The Maid of the Mist is a Mineral Point property, which recently has attracted favorable attention by reason of the fine grade of mineral found in the shaft at a depth of 75 feet. The working force is employed in running a cross-cut, which has already reached a length of 50 feet, and in removing ore from the shaft. The character of this ore is gray copper of very high grade. This property is on the same vein as the Old Lot, and the shaft is only 2,000 feet distant from the recently encountered ore-body on that property. From the report of operations of the Tom Moore Mining Company furnished by Mr. J. B. Fay, the president, it appears that very little has been done during the year. On the G. F. Parmelee, the Emma, Robert Burns, and Byron lodes only assessment work was done. On the Tom Moore mine some assessment work was also done, and most of the development work done by the company was in tunnel No. 2 of this mine. In an opening near its entrance a fine body of galena ore was exposed, showing about 2 feet of good ore. Two hundred and forty feet from the entrance, on a cross-cut, the vein was cut, showing ore as follows: (1) A streak 20 inches in thickness, showing copper, iron, silver, and lead; (2) two feet of porphyry, soft and pliable, showing a sprinkling of native copper; (3) from 8 to 10 inches of native copper mixed with porphyry or talc, assaying 29 per cent. of copper; (4) a streak of fine galena ore. Nearly all the new inventions for concentrating ore have been condemned as useless and expensive, and the best results have been obtained from a very simple process long in use in California, Australia, and other mining districts, viz: First crushing the ore and then concentrating by Cornish or plunge jigs, simply made. The capacity of one jig is 1 ton of concentrates per day.

On the Alaska a force of 7 men is engaged in cross-cutting for the vein from the bottom of the 170-foot shaft. The Alaska vein is a very strong one, but rich mineral has, near the surface, been somewhat pocksety.

The Little Dora has over 600 feet of development. The Dora vein averages from 8 to 10 feet in width between walls. The gangue is a calc spar of about 70 per cent. pure lime.

The following, taken from the La Plata Miner, shows the value of the ore shipped from the mines of this county during the year. Some of the mines mentioned in this list are, however, located in other counties

Name of mine.	Value.	Name of mine.	Val
Old Lot	$200,000	Louisa M	
North Star, on Solomon	110,000	Transatlantic	
North Star, on Sultan	95,000	American Eagle	
(Name furnished, but not for publication)	98,000	Pride of the Rockies	
San Juan Chief	45,000	Anchor	
Molas	21,000	Queen City	
McCoin & Lewis (concentrates)	17,183	Chattanooga	
Aletha	12,000	Minnehaha	
Belcher	13,500	Crown Point	
Steidacona	11,375	Sunlight	
Cleveland	10,500	Sunnyside	
Hamlet	1,820	Santa Cruz	
Figie	1,000	Tin Cup	
Sampson	5,000	Parson's	
Alaska	2,500	Abbie S	
Mineral King	3,500	Wall Street	
Galena	1,200	Saxon	
Emerald	2,400	Capital	
Senior Warden	4,500	Victoria	
Idaho	5,400	Greenleaf	
Empire	6,520	Sears	
Surprise	2,200	Pilgrim	
Sunnyside Extension	3,000	Inge	
Lone Star	1,200	Magpie	
McMillan	1,000	Captain Jack	
Maid of the Mist	4,200	Ajax	
Jaggers (concentrates)	2,100	Silver Globe	
Margie	1,600	Magnet	
Sir John Franklin	1,400	Atzon	
Lackawanna	1,173	Group of twenty-eight claims	8
Mystery	2,600	Total gold, silver, and lead	75
Silver Ledge	464		

The shipments from the county are about 8,000 tons, showing an crease of about 600 tons over last year, when the shipments from county were about 7,400 tons. The falling off in the total shipme by way of Silverton amount to over 1,000 tons, which can be mos accounted for by the idleness of the Congress and Hudson and the duction in shipments from the Yankee Girl and National Bell mines Red Mountain.

SAN MIGUEL COUNTY.

The output of this county for 1884 is a most agreeable surprise. mines have made great progress in development, and have shown decided improvement both in vein and vein-filling.

The Gold King 20-stamp mill has been steadily operated, and shipp over $50,000 in gold bullion.

The Golden Group mill turned out $53,000 in gold from ore of Nellie mine.

The Belle 10-stamp mill and the Bossick & Leslie mill, of 10 stam and six Frue vanners, have been completed and will handle both g and silver ore.

The Boomerang is erecting a tramway and has made arrangeme for a 20-stamp mill and concentrator.

The 20-stamp mill of the Pandora Company has been run on ores that and the Oriental mine, and has also been concentrating low-gr ores of the Sheridan, Cimarron, Smuggler, and Mendota.

The McFarlane 5-stamp mill has been busy during the season, as also that of Goebel & Lane, at Ophir.

In *Marshall Basin* the mines that produced in 1883 have contin to improve with each foot of development. On the vein known as Smuggler, which can be traced over 2 miles, are located the Mend *Sheridan*, Union, Cleveland, Bullion, and Hidden Treasure. The C

arron, Revenue, and Grand Central, which cross it, are equally rich in quantity and quality.

The Sheridan, on this same vein and south of the Mendota, has been a lively shipper during 1884. Level No. 4 has been extended 40 feet; level No. 3, 70 feet; level No. 2 started from surface and run 200 feet; and level No. 1 also opened from surface and run 500 feet. A winze of 80 feet has been sunk between levels 3 and 2, and one of 120 feet between levels 2 and 1. An adit level from the extreme southern end of the Sheridan ground has been started and is now in 50 feet. The season's work has been almost wholly in the line of development. No new stopes have been opened and but little ore taken from the old stopes. From this work have been taken 1,400 tons of ore, nearly 400 of which have averaged $225 to the ton. The balance of the output, averaging from $50 to $55 per ton, has been concentrated at the Pandora mill, the concentrates running up to $400 to $450 per ton. There are now 175 tons of first-class ore on the dump.

The Union and the Revenue have been doing considerable dead work.

On the Cleveland, Bullion, and Hidden Treasure but a small amount of work was done during the year, and no ore shipment reported.

The Cimarron has produced a large amount of ore rich in gold, of which 320 tons were shipped to Denver and Pueblo, and over 600 tons of concentrates were worked at the Pandora mill. It has three levels, the lowest reached by a cross-cut of 98 feet in length, from whence a drift has been run 176 feet on the vein, from which a winze is being raised to the second level. The drift has been continued about 200 feet from this winze and is now in ore carrying rich copper. The second level is in about 480 feet; the stoping has been above this level.

The Flora mine, in the same basin, has been worked under contract. Work on the main shaft having been completed, the shaft being down 110 feet, another contract has been let to run a 100-foot drift on the vein, beginning at a point 150 feet from the top of the main shaft. Two feet of ore are reported in the bottom of the main shaft.

From the levels of the Pandora and Oriental considerable ore has been stoped in 1884, which was crushed by stamps belonging to the company. Over 3,000 tons of ore have been removed, partly from the opening of the galleries and partly from the stopes. The character of the ore is a copper and iron pyrites, carrying free gold. Though the ore is low grade, the economical mode of extracting and the large quantity make this one of the foremost mines in San Miguel.

Of the Fortuna, the following is from the Ouray Times of November:

"The Fortuna is situated near Marshall Basin, on the same vein with the Argentine, Cincinnati, and other well-known properties. The vein is from 8 to 12 feet in width, and a level driven on the property by former owners failed to show any ore of consequence. Last year a small amount of work was done on the surface, and a large body of ore was found that ran from $20 to $30 in gold. A very rich gold discovery was reported to have been made in it late in the fall."

In Bridle Veil Basin are numerous prospects. The veins are broad and the mineral can be worked in a common stamp. Enough work was done during the past season to demonstrate the existence of mineral.

The San Miguel Gold and Silver Mining Company own three claims, that possess an aggregate of 600 feet of development.

The Millionaire and Millionaire No. 2, the Laura Cliff and Birthday, and the American Exchange are among the good prospects.

The Summit Creek mine, though possessing but a small amount o development, has shipped considerable ore that was rich in gold.

In *Bear Creek* is the Nellie, a mine on which dead work has been done for some years, and from which in two months' time the shipments were such that the owners were reimbursed for all expenditures, and the company now has a good working capital.

Tunnel No. 1 is in 228 feet, and level No. 2, 288 feet, and under ground about 250 feet, showing a strong, clearly defined vein from 15 inches to 3 feet in width. A raise has been commenced to open an air-shaft to the surface. From this raise or mill-hole about 20 feet of drifting has been done each way, showing a body of rich ore.

In *Ingram Basin* are numerous properties that are gradually coming prominently forward.

The Andrus lode is developed by three levels: No. 1, upper level, 19 feet open cut, 25 feet under cover; No. 2, 15 feet open cut, 10 feet under cover; No. 3, 25-foot drift.

Near Telluride is the Boomerang mine, a property that has paid from grass-roots, and the ore extracted has paid all expenses of developing and surface improvements. The developments consist of an incline following the dip of the vein 110 feet. A cross cut tunnel 140 feet long intersects the vein 30 feet below this incline. A winze connects the tunnel and incline. Very little ore has been stoped. The surface improvements consist of ore and engine houses and a tramway 1,550 feet, by which the ore will be transported to the wagon-road.

Trout Lakes is a new district in the southern part of the county.

The San Bernardo and Honduras, two locations on the same vein in the Lake Fork Pass, and the Garibaldi, Fox, and Kent, and many others, have produced some high-grade mineral.

In *Lower San Miguel district*, in the vicinity of Ames, is the Gold King mine. The mine was worked this season from about the 1st of July. From 25 to 40 men have been employed at the mine during the season. The tramway, which is one of Houston's patent improved trams, continues to work with the regularity of clock-work, delivering the ore from the sixth level to the mill. The last run of the mill was very satisfactory, and although only 5 and 10 stamps were kept going, the gold produced more than paid the ordinary running expenses. The mill has 20 stamps. The Hard Cash has been worked during the season, the development showing up in the shape of a shaft 175 feet deep. Scattered as the mineral is, some rich shipments were made last fall. Several tons, in two lots, returned 119 and 122 ounces in silver per ton. The character of the ore is chloride, with some heavy galena.

Ophir district has now quite a number of producing mines, and has added during 1884 considerable to the output of the State. The Nevada has been a steady producer in 1884. The second class mineral runs 15 ounces, first class 254, while choice lots reach as high as 500 and 600. The first shipment made to Silverton this season crossed the range June 15; since then regular shipments have been made. Five tons of ore were sent to Montrose, being the first lot shipped that way. Parties have leased the Nevada dump, and a great deal of the fine mineral being jigged, by which process 200-ounce ore is saved.

The What Cheer is looking well and has shipped some ore. The main pay streak, of blue-looking quartz, is about 18 inches wide, in which some fine free-gold specimens have been found.

The Sulphuretto mine has become a producer during the year. The mine was worked some years ago with poor success, and has lain idle *for some time*. Drift No. 1 is in 245 feet; a portion of this distance was

run on the old working. Sixty-five feet of stoping ground have been prepared. Upper level No. 2 is in 48 feet, this being run in twelve shifts.

The same parties have a lease on the Valley View. Drift No. 1 is in 110 feet; about 250 feet from this, No. 2 is in 115 feet. The third level, being just commenced, is in only a short distance. No stoping has been done. The pay streak averages from 6 to 8 inches, giving 244 ounces silver and 36 per cent. lead. Character of mineral, galena and sulphurets. Four men have been working and some ore shipped.

Grand View is located on the summit of Silver Mountain, near Ophir, and is now producing from 4 to 5 tons of good ore per day, with a small force of men. Three hundred sacks of ore were shipped to Silverton and four hundred sacks are now ready for the burro trains. The upper drift of the Grand View is in 127 feet and the lower drift 85 feet, a portion of which has been run through slide rock.

The Summit has been worked by 12 men, who have produced some good ore.

About 1,000 feet below the Summit is the Windsor, which is being worked by a shaft down 55 feet, showing a strong vein 4 feet wide, producing galena and carbonized lead, running 200 ounces.

The Gold Eagle is a new discovery. A drift of 125 feet has been run on the vein, showing 2 feet of pay ore, which is being taken out in large quantities and sacked for shipment.

The Globe, on Silver Mountain, has a tunnel of 125 feet, with a pay streak, while the Suffolk, near by, has a 100-foot drift, showing a decomposed vein from 4 to 12 feet wide, with some gangue matter. Ten tons of ore are on the dump of the latter.

The Parnell is a late discovery on Silver Mountain, and has been opened only 6 feet in depth, from which about 10 tons of ore were taken.

The Chancelor, Cordillerous, and Saint Jo have had some work done on them.

The Mohawk has a drift of 170 feet; shaft down 100 feet; drift from bottom of shaft 35 feet. Some ore has been shipped, which runs 153 ounces silver and 40 per cent. lead.

The Great Eastern, located at the head of Nevada Gulch, has a drift of 270 feet, and two shafts, one of 30 and the other of 50 feet. The vein is 5 feet wide, with a pay streak 10 inches.

On the Caribou the cross-cut taps the vein 175 feet in, with a tunnel level of 250 feet. At the west end of the tunnel a shaft of 170 feet has been sunk. Down this shaft, level No. 2 has been run 180 feet. The third level runs 310 feet.

The deepest workings are at 360 feet, where the richest mineral is found. The pay streak widens and narrows, but averages 12 inches of good mineral. The mineral is principally galena, running from $70 to $90 per ton. Eight miners are employed and about 3 tons of sorted ore per day extracted. The first class goes to Silverton and the poorer to Ames.

At the Silver Bell work was resumed in July, 3 men being employed and extracting considerable galena ore, which runs 130 ounces. The last shipment went to Rico's new smelter.

On the Cleveland lode, on Silver Mountain, 40 sacks of ore were taken out and a drift is being run.

On the Butler considerable development has been done and shipments have been heavy. A force has been continually at work and succeeded in running a 350-foot tunnel on the cross-cut. In the old working west of this cross-cut the ore extracted during the year has paid all expenses of working, besides leaving some profit. The aggregate amount of *developments in shafts*, drifts, and winzes is nearly 600 feet.

SUMMIT COUNTY.

While the output of mineral from some portions of this county wa insignificant and the total production smaller than usual, the strike made in the latter half of the year have stimulated mining industrie and prospecting and exploring have been extensively carried on. I the *Ten-Mile district*, especially around Robinson, explorations hav disclosed large ore-bodies.

Gibson Hill, near Breckenridge, is booming because of the discover of gold lodes. Chihuahua is coming to the front with new producin mines.

The South Park Railroad is offering very low rates to shippers; ol mills are being repaired and new ones built; in fact, the whole count seems to have new life enthused into it, and the managers and owne are working hard through this winter to enable them, when the sno is gone and the roads open, to take their ore to market.

A strike is reported to have been made by E. C. Moody at the hea of Georgia and American Gulches, near Breckenridge, Summit Count

The Boston Mining Company, at Saint John's, have been producing small amount of ore.

The Blanch mine is being successfully worked, connection havin been made with the shaft at a depth of 140 feet by drifting on the vei a distance of 300 feet. The vein is galena, carrying 40 per cent. lea and 35 ounces silver, and showing ore all the way.

Chihuahua district.—Mining is said to be improving. A number c mines carrying high-grade ore are being worked, among them the Pick wick, which is said to have produced $3,000 in sinking the shaft to th depth of 50 feet. The Eliza Jane has also produced some ore. Th Maid of Orleans, Rothschild, Winning Card, Chihuahua, Queen, an Edith are said to be promising properties.

The Silver Queen mine, near the summit of Argentine Pass, is workin a force of 10 miners, and sinking and stoping are being vigorously pros cuted. A ton of ore a day is being produced, which mill-runs $400 si ver. The pay streak averages from 3 to 10 inches of solid mineral, th character of which is gray copper and sulphurets.

The Rochester Queen mine employs a few men. The I. X. L. is thoug to be a fine property and has a concentrating mill of 40 tons capacit worked by a wheel. Owing to litigation it has not been producing.

About 2 miles below Swan City the Ouray Placer Company are ma ing preparations for mining gold placers. They have a saw-mill in oper tion cutting lumber for flumes, &c., and have built a ditch 1½ miles length.

The Boss mine employs a few men on a vein yielding gold. On th apex of the mountan, at an altitude of some 11,000 feet, is the Ontari and just below, on French Gulch, the Elephant, employing a dozen me

In *Ten-Mile district*, at Felicia Grace mine, ore was discovered at depth of 85 feet in an ore-chute similar to the old Robinson, an adjoi ing property, which has induced a large amount of prospecting to done.

On neighboring claims about 100 men are employed. Three of the properties are shipping ore. The ore is sulphide and is from 12 to feet thick, and mills from 40 to 90 ounces in car-load lots. The Felic Grace has shipped over 700 tons of ore, and is still shipping at the ra of 10 tons per day; the Result about 400 tons, and averages 8 tons p day; the Last Chance 100 tons, and is shipping 3 tons per day; t shipments from Felicia Grace are to the Argo works, at Denver. The

s averaged 55 ounces of silver, leaving a handsome margin payment of $20 freight and reduction charges and 10 per cent. lver. The lessees are now sinking another shaft near the end e claim upon the dip of the chute.

Herman Silver, assayer in charge of the mint at Denver, of the bullion production of Colorado for the twelve months ending December 31, 1884.

Counties.	Gold.	Silver.	Total.
.....	$402, 986 95	$127, 747 59	$530, 734 54
.....	81, 284 74	192, 394 92	273, 629 66
.....	688, 864 44	1, 729, 189 55	2, 418, 053 99
.....	337, 787, 98	244, 444 87	582, 232 85
.....	1, 328 02	65, 843 58	67, 171 60
.....	1, 100 00	.....	1, 100 00
.....	30, 938 00	225, 000 00	255, 938 00
.....	2, 050, 967 62	362, 738 69	2, 413, 706 31
.....	.....	1, 000 00	1, 000 00
.....	58, 209 97	515, 824 47	574, 034 44
.....	2, 411 00	210, 142 71	212, 553 71
.....	675, 133 39	9, 622, 553 45	10, 297, 686 84
.....	500 00	6, 755 09	7, 255 09
.....	11, 471 20	930, 259 40	941, 730 60
.....	71, 551 78	386, 706 65	458, 258 43
.....	1, 000 00	935, 024 81	936, 024 81
.....	128, 064 03	15, 489 48	143, 553 51
.....	13, 575 00	.....	13, 575 00
.....	1, 587 81	103, 590 49	105, 178 30
.....	80, 344 70	764, 423 29	844, 767 99
.....	115, 658 01	432, 578 60	548, 236 61
.....	41, 914 26	409, 918 23	451, 832 49
.....	4, 796, 628 90	17, 281, 625 87	22, 078, 254 77

CHAPTER V.

DAKOTA.

The Black Hills of Dakota have added to the wealth of the countr during the past year their customary annual yield of the precious metal No material change has taken place in the character of the minin operations or the amount produced. Nearly all of the bullion obtaine from Dakota mines goes directly to the United States assay office i New York, so that it is not difficult to trace and ascertain the produ of the Territory.

During the year the deposits of Dakota gold at the New York assa office amounted to $3,010,730, and at the Philadelphia mint to a litt over $2,000. These sums represent, within a very small amount, th product of the Territory. The reports of private refiners show that th received from Dakota for treatment between $200,000 and $300,0 worth of gold, and about $100,000 of its silver product. Adding f other gold and silver from the Territory a small amount deposited i the New York assay office and Philadelphia mint as refined bullio and not credited to Dakota, I have estimated the production of th Territory for the year 1884 to have been—

Gold	$3,300,0
Silver	150,0
Total	3,450,0

being $100,000 more in gold than in the preceding year, occasione principally by the increased production of the Homestake group.

The mines of Dakota, situated in the extreme western portion of th Territory, lie between the north and south forks of the Cheyenne Rive comprising Lawrence, Pennington, and Custer Counties, the form containing the largest and most productive mines and supplying a but a small fraction of the product of the Territory. Both placer an quartz mining are prosecuted, the former, however, being quite insi nificant as compared with the latter. The placer mines that have be worked are located principally in Deadwood, Whitewood, Gold Ru and Bobtail gulches.

The Black Hills Gold Placer Company, organized in 1881, has a flu 16 miles long, which carries the water of Spring Creek for hydrau purposes. In the same year the Rockerville Rock Flume Compa was organized for working the claims on Rocker Gulch.

Last year the Harney Gold Mining Company was organized, whi secured all the old claims on Battle Creek. They built a flume 6 mi long, for the purpose of bringing the water of Grizzly Gulch and Bat Creek to their bars. In one place a ditch 40 miles long has been c struced for placer working.

Quartz mining is the principal industry. The lodes are of immen size, containing very low grade ore, averaging only about $4 per to *but which* is so economically treated that ore has been worked a

profit which runs only $2 to the ton; the expense at present of mining and milling not amounting to $1.

The mills are the largest and best equipped in the world, all of them having from 40 to 200 stamps. The first stamp mill began operations in the Territory in 1877, and in the brief period of seven years, notwithstanding the fact that this country has been inaccessible by railroad, being reached only by stages and expensive teaming, the mills in operation at the present time contain 800 stamps, in addition to which over 400 stamps are idle.

The mills in operation at the present time are the Homestake, 200 stamps; Highland, 100 stamps; Golden Star, 120 stamps; Deadwood, 100 stamps; Terror, 80 stamps; Father de Smet, 100 stamps; Gustin, 20 stamps; Minerva, 25 stamps; Uncle Sam, 15 stamps; Standard, 20 stamps; Oro Fino, 20 stamps; total, 800 stamps.

The silver mines, yet in the infancy of their development, are nearly all located in Lawrence County, in the neighborhood of Bear Creek and Galena. The ore is generally of high grade, but as it has to be shipped by wagon a distance of 250 miles, and then by railroad to Omaha for treatment, it has not been found a very profitable industry. The discovery of tin mines in the Black Hills has occasioned considerable interest, and the fact has been established beyond all question that valuable tin deposits exist in this region. The first discovery was made near Harney's Peak, about 50 miles south of Deadwood, in what is known as southern portion of the Hills. A quantity of the ore was smelted, and it is reported that 5,000 pounds of metallic tin were obtained, samples of which have been examined by competent chemists and also at the assay laboratory connected with my office. The ore is found in hard white spar and in true fissure veins, lying between walls of mica or slate formation.

The Etta is the principal tin mine upon which work has been done.

The discovery of mines of mica promises to prove of immense value, not only to the Territory but to the whole country, as the demand for merchantable mica has largely increased and the price correspondingly advanced. The principal supply at present comes from the mines of North Carolina, which have produced about 75,000 pounds per year. It is thought that the product of the mica in this country, by reason of the new discoveries in the Black Hills, will be able to meet the growing demand.

The principal mica mine in the Territory is the McMacken, located about 3 miles north of Custer. The New York mine, located in the same neigborhood, has produced about 5,000 pounds of mica of marketable quality.

Other properties are known to exist, and the following statement, taken from the Black Hills World, shows the amount sold by each and price realized:

Name of mine.	Pounds.	Amount realized.
Black Hills	45,000	$135,000
New York	5,700	19,950
Last Bonanza	26,000	113,100
Climax	7,940	34,539
Other mines (estimated)	40,000	140,000
Total	124,640	442,589

The contribution of each of the three producing counties to the production of the Territory in 1884 was approximately as follows:

County.	Gold.	Silver.	T
Custer	$180,000		
Lawrence	3,000,000	$150,000	3,
Pennington	120,000		
Total	3,300,000	150,000	3,

The dividends declared by the mines of Dakota during the yea stated to have been as follows:

Mine.	Number of dividends.	A
Big Bend Hydraulic	12	
Father De Smet	10	
Homestake	12	
Total	34	

LAWRENCE COUNTY.

Whitewood district.—The property of the Homestake company lies cipally between Deadwood and Gold Run. Notwithstanding the mense amount of ore which has been extracted from it during the six years, averaging only about $4 a ton, and yet which has enabl to declare dividends aggregating over $4,500,000, the deposit seen most unlimited. A 200-stamp mill has been erected, and it is tho that the mine has enough ore in sight to insure a supply to the mill. A tunnel is being run on the property to tap the B. & M. in what was formerly the Giant and Old Abe mines. The tunne be 8 by 9 feet, and will enable an ore train to operate the lower l of the Giant and Old Abe properties. The production of the H stake mine during the year 1884 was $1,252,765.70 as against $1,17 in 1883.

At the Father De Smet work has been continued during the year no change of any importance is noted. The general outlook of the is unchanged, with the exception that the ore breasts around the E open cut show more slate than heretofore. The production of the for the year was $474,552.94 against $355,423.61 for the previous The net profit for the year was $240,352, of which $200,000 was p dividends. The number of tons produced was 106,540, which ave $4.45 a ton in gold. Since its incorporation, the Father De Smet has paid forty dividends to stockholders, and there have been bu assessments levied, amounting in all to $200,000, the last one bei November, 1878.

The Deadwood-Terra's product for the year was $466,532.78, ag $245,650 in the previous year. The total number of tons of ore u from the 1st of July, 1883, to the 1st of July, 1884, was 152,99 which was received $540,525.56.

The production of the Highland mine for the year was $511,740.

The Caledonia is not producing, owing to a recent cave, which *and closed* the entire underground workings of the mine. A

started to tap the 400-foot level is in 200 feet. A mill has been set to work upon ore taken from the 300-foot level.

Carbonate Camp district.—Work has been prosecuted during the year on the Eureka, the shaft being down 18 feet, while the Yankee, Jay Gould, and Garfield are considered promising claims.

The Iron Hill mine has produced considerable bullion during the year, which was shipped to the Hallenbach Smelting Company, at Deadwood, and produced $25 in gold and $4,447 in silver. The work done on the property consists of a 200-foot vertical shaft, with cross-cuts and drifts on the 165 and 200 foot levels, containing large bodies of ore, said to carry 200 ounces of silver to the ton. Information in regard to this district has been furnished by Mr. M. R. Hydliff, of Bear Gulch, and Mr. F. J. Davey, of Galena, who report the production of gold from the placers of this section to have been as follows: Iron Creek district, $1,500; Potato Creek, $4,500; Rawlings Creek, $4,500; Hurricane district (Wyoming Territory), $3,000; total, $13,500.

Mr. Hydliff says that the promising mines are the Little Lucy, the Rough and Ready, the Giant, the Bertha, Isabel, and Portland. The placers of this section were once excellent producers, but it is thought that owing to the advantage of a plentiful supply of water they were nearly worked out. The tin mines of Nigger Hill and vicinity are now exciting considerable promise.

The Rough and Ready is developed by an open cut exposing the ledge for 50 feet in width, showing good tin ore assaying $8 per ton in gold and a trace of silver.

The Giant has a tunnel 300 feet long and a shaft 60 feet deep showing a good face of tin and carrying some gold. The Morning Star has a shaft down about 10 feet showing tin ore, and the Michigan is developed by a tunnel 65 feet also in tin ore. The Ohio and Indiana, and the November are promising locations. The Crow Dog has a shaft 35 feet in good tin ore, carrying $7.60 in gold and $1.60 in silver. The Sontag, Steptoe, and Spearfish all carry similar ore.

Lying between Mace and Wyoming gulches is the Swansea group, consisting of Swansea No. 1, opened by a shaft 12 feet deep; Swansea No. 2, two shafts 14 feet deep; Swansea No. 3, shaft 25 feet deep, and Swansea No. 4, shaft 12 feet, all carrying gold.

The Boston group consists of five locations, the Boston, opened by a shaft 25 feet deep, Commercial, New York, Atlantic, and Pacific, all carrying tin ores.

The following comprises the list of the reported production of mines of this county:

	Gold.
Iron Creek district	$1,500
Potato Creek district	4,500
Rawlings district	4,500
Homestake Company	1,252,766
Deadwood Terra Company	466,532
Highland Company	511,740
Father De Smet Company	474,553
Total	2,716,091

PENNINGTON COUNTY.

Some of the most valuable placer mines of Dakota are situated along the foot hills in the western section of this county. The ore is low grade, but free milling and abundant, and can be extracted and treated with but little expense. During the last year probably two hundred persons

have been engaged in placer mining during the summer months. Th water is supplied by Rapid Creek.

Rocker Hill placer mining district is situated south of Rapid City, o a high table-land. There is no stream of water running through th district, and water is obtained by damming springs.

Rochford district lies partly in Pennington and partly in Lawrenc County and contains some valuable quartz mines. On the two princi pal creeks, Castle and Rapid, placer mining is carried on to a slight ex tent.

Mr. C. H. Enos, the superintendent of the Minnesota Mining Com pany, reports that work has progressed during the year, but no ore has been milled. Three thousand tons milled previously averaged $4.54 to the ton. The ore-body is 150 feet wide and well developed to a depth of 165 feet.

Mr. Fred. J. Cross, of Rockerville, reports the production of the placers of this county to have been for the year:

	Gold.
Rockerville placer district	$18,000
Hayward placer district	15,000
Harney placer district	700
Total	33,700

Harmer Gulch.—Mr. William Batchelder, superintendent of the Gol den Summit mine, reports that "the shaft has been sunk 50 feet, with levels and cross-cuts of 50 feet to the lead, which has been found to be 15 feet wide, averaging 31 ounces. On the 130-foot level a cross-cut was run 157 feet, which struck the lead 13 feet wide. At present there are three distinct leads. Other developments consist of a tunnel 112 feet, a cross-cut 65 feet, and a shaft 50 feet, all done in the past year. Thirteen men have been employed, and the company will erect a 60- stamp mill in the spring.

The Greenwood Mining Company has just completed a 120-stamp mill, but as yet no production is reported.

On the Bengal Tiger work has been pushed, and the tunnel is now under cover a distance of nearly 400 feet. The total length of the cut and tunnel is 437 feet. The shaft and whim-houses of the Bengal Tiger were destroyed by fire shortly after the close of the year.

At the Stand By mill in *Rochford district* 30 stamps are in opera tion and some ore has been produced, but owing to disagreements among the owners no very extensive progress has been made.

The Castle Creek Hydraulic Mining Company have again commenced work on their mining properties.

Mr. J. L. Chipman, of Lookout, reports the production of placer gol from the bars and gulches of Castle Creek and vicinity, and also fro Chipman's Bar to Bell's Bar, a distance of about a mile, to have bee about as follows:

Chipman's Bar	$3,4
Jones's Bar	9
Darlington	9
Sharpe	1
Peas	6
Hamilton	7
Bell's Bar	7
Hill and Gulch Claims	3
Other bars	2
Total	8,0

He says that more gold has been taken out of the bars the past summer than ever before. The formation is slate, and the gold is on and in the bed rock, which has to be taken out.

The Jenny Lind mine reports a production of $5,000 worth of gold.

Prospecting is continued on the Silver King mine. From the 50-foot level a cross-cut was run 21 feet through the lode, but no ore has been as yet extracted. Assays show gold 10 ounces, silver 14 ounces, copper 30 per cent. to the ton.

Ruby Camp: The property of the Ruby Camp Gold and Silver Mining Company, located in Ruby Gulch, is thought to be one of the best silver prospects in the Hills. At present several men are at work prospecting. The ore carries both gold and silver, the latter largely ruby.

The Lancaster mill has been thoroughly overhauled and work started up. The mine has a tunnel in 450 feet, and a force of 20 men is employed.

The Minerva mine has produced about 100 tons of ore a day.

Work on the Grand Junction has been pushed with two shifts, and the shaft is now 40 feet deep.

A shaft has been sunk on the Dakota Maid to a depth of 60 feet, and a cross-cut 68 feet extended on each side, showing rich ore.

The Rich mill has been leased by Mr. Davey, and is said to be successfully conducted.

At the Uncle Sam mine the main shaft is being extended, and ore extracted from the 150-foot level sufficient to keep 15 stamps employed.

Work has been done at intervals at the Oro Fino, in Strawberry Gulch.

The following comprises a list of the reported production of gold of the mines of this county:

Rockerville placer mining district	$18,000
Hayward placer mining district	15,000
Harney placer mining district	700
Jenny Lind mine	5,000
Chipman Bar	4,403
Jones's Bar	925
Darlington Bar	900
Sharpe Bar	175
Pease Bar	600
Hamilton Bar	750
Bell's Bar	700
Hill and Gulch claim	320
Others close by	225
Total	47,698

CHAPTER VI.

IDAHO.

The chief industry and the principal source of the wealth of this Territory is mining. It employs a larger number of persons and amount of capital than any, indeed than all, other industries, and although yet in its infancy has, during the past year, added to the wealth of the country nearly $4,000,000. The mines of this Territory are worked very largely by private persons and unincorporated companies, and have not figured extensively upon stock boards, nor in sinking large amounts of capital in worthless prospects or pretentious schemes. Their production has gone directly to remunerate those actively engaged in this industry, and very largely to residents of the Territory.

Idaho contains extensive belts of mineral deposits only partially explored, which commence in Wood River country and extend to the northwest as far as Cœur d'Alene, while its placers on the Snake River and in the southern portion of the Territory have for many years yielded large quantities of gold. In many of the best districts but little work has been done during the year, but in other sections, especially the Wood River and Cœur d'Alene countries, mining has been actively prosecuted. In the former, smelting furnaces have been constructed, hoisting and concentrating works erected, roasting furnaces built, and several new and valuable mines discovered. The Cœur d'Alene country has continued to attract marked attention, and the tide of prospectors has continued to flow in that direction.

The general formation of this country is slate, and the creeks flowing through the cañons have so far been the principal sources of mineral wealth. The gravel found in their beds is very loose and coarse, the gold, water-worn, occurring frequently in nuggets. That found so far was on the bed rock and in the crevices.

The production of the Territory during 1884 was about $4,000,000, of which $1,250,000 was gold and $2,720,000 silver. This was distributed among the counties approximately as follows:

Counties.	Gold.	Silver.	Total.
Ada	$5,000	.....	$5,000
Alturas	100,000	$1,450,000	1,550,000
Boise	400,000	40,000	440,000
Cassia	5,000	.....	5,000
Custer	200,000	1,000,000	1,200,000
Idaho	110,000	.....	110,000
Lemhi	75,000	20,000	95,000
Nez Perces	500	.....	500
Oneida	4,500	.....	4,500
Owyhee	100,000	200,000	300,000
Shoshone	250,000	.....	250,000
Washington	.....	10,000	10,000
Total	1,250,000	2,720,000	3,970,000

he following review of the mining industries of this Territory has n mainly compiled by Mr. N. H. Camp, in charge of the United tes assay office at Boise City. I am indebted to Mr. John B. Hast-s, United States deputy mineral surveyor of the Territory, for a very iable report on the mines of Upper Wood River country, which has n inserted in the proper place.

ADA COUNTY.

lacer mining is the character of most of the gold production of this ity. There are a few locations in quartz which have not been de-ped for profitable mining, although some of the prospects are con-red good.

ldwell district is located along Snake River, and for a few miles re the mouth of Boise River. Some placer claims have been located ng the year, which promise well. Manhattan Bar, one of the rich-locations on Snake River, has a water right of 5,000 inches with a p of 14 feet at the river. It is being worked by a stock company. xceedingly rich placer gold diggings have been discovered about 3 s below Caldwell, in Boise River Valley, which extend some 12 miles nd. About one hundred claims have already been located upon y of which work is progressing vigorously. There is a good supply nning water.

the south channel of Boise River, which formerly ran through what w called Dixie Slough, the gold is found for a distance of 12 miles e old river bed. The character of the gold is different from that d in Snake River, being "shot gold" and of an assay fineness of about 740, while Snake River gold uniformly runs above 900, and a floury character.

ALTURAS COUNTY.

e placer mines on Snake River, the southern boundary of this ty and on the Lower Wood and Boise Rivers, have added very con-ably to the production of gold in 1884. The exact amount cannot iven, as many of the claims are worked by Chinamen, who decline ate the amount, but the product of the county is believed to have about $20,000.

lmon Falls district is the largest gold producer on Snake River. J. B. Hunt, whose system of ditches and machinery is very com-, reports his output for the year at $10,500. Five men are em-ed by him, and he has 4 miles of ditch. Three acres of the bar were d.

. Jacob Stotz employed one man two hundred and sixty days; his was 68.40 ounces, equal to $1,300.

. C. E. Corker's placers, located near Glenn's Ferry, employ 3 Water from Cañon Creek is carried through a ditch 3 miles in h. The yield is about $4,000.

e Arthur Company's placers, situated at Boulder Hill and the Juni-Midas, Vulcan, and Florence, located further up the river, have not operated during 1884. The Hamburg Bar Company has been put-in mining machinery and cutting a ditch for operations in 1885. placer grounds of Lower Wood and Boise Rivers are, with few ex-ons, worked by Chinese.

cky Bar district.—Placer mining has been carried on during the in Bear Creek and its tributaries, and also on the south fork of the e River by the Chinese, with an estimated gold yield for 1884 of 00.

The group of gold mines on Idaho Hill, comprising the Vishnu, Idaho, Golden Sierra, Wizard King, and Emmet have been in litigation, and the output during the year will not exceed $25,000. The Bonaparte has been idle. On the Ada Elmore a tunnel 631 feet has been run to cut the vein. The hoisting and stamp machinery is run by two steam engines of 125 horse-power each. The engines and machinery have been put in thorough repair.

Lower Wood River Country.—*Belleview district.*—The principal mines in this district are the Minnie Moore, Queen of the Hills, Queen Victoria, Lark, Monday, Oswego, Morton, Belleview King, and Hamburg.

The Minnie Moore is the only mine on Wood River that is owned by a foreign corporation. The vein is opened by an incline 200 feet deep, with intermediate adits and a winze from the lower level, now 40 feet in depth. From the surface to the 200-foot level the ore remained of the same character, but increased in the quantity of silver contained as depth was obtained. In the winze below the 200-foot level the ground is softer and more economically worked. The yield of the mine has been about 75 tons a day, and daily shipments were made of about 20 tons of first-class concentrates. The capacity of the concentrating works is about 50 tons a day, and additional works are being erected to increase it to 75 tons. The incline shaft is being enlarged to three compartments, and is being timbered and cribbed. A new double drum hoisting-engine has been erected, the old one being used to hoist ore from the dump. At the concentrator two more strings of jigs, in addition to three already in operation, are being constructed. About one hundred persons have been employed during the year, and the production is reported at 220,860 ounces of silver and 1,638 tons of lead.

The Queen of the Hills is located in the hill facing the town of Belleview. Its mill is at the mouth of the tunnel, and the ore cars of the mine dump the ore at the foot of the rock crusher. It has five 3-compartment jigs besides other necessary machinery, which can produce 10 tons of concentrates a day, from about 40 tons of ore. The mine has been yielding about one car-load of first class concentrating ore per day, averaging 67 per cent. lead and from 85 to 100 ounces of silver to the ton. This is shipped to Salt Lake. The mine is being thoroughly explored, and already contains over 3,000 feet of tunnels and levels. From 15 to 20 men have been employed in the mill and about 45 in the mine.

On the Belleview King both walls have been reached, and the vein will average 60 feet, two of which are rich gray copper ore. A shaft is being sunk.

The Lark mine, about 2½ miles south of Belleview, is opened by a shaft 60 feet deep, and at the 35-foot level a drift has been run 50 feet through a galena vein about a foot wide. At the 60-foot level another drift was run 70 feet, the vein here being nearly 2 feet in width.

The Hamburg mine produced only about 1,100 ounces of silver and 1 ton of lead during the year, employing 4 men for a period of sixty days.

Atlanta district.—Near Atlanta City is a large mountain some 9,000 feet high, near Sawtooth Range, but isolated from the main range of mountains, which occupies a space of about 4 miles square at the junction of the Middle Boise and Yuba Rivers; along its summit are indications of a large fissure, and along its margin a number of smaller fissures.

According to the reports of Mr. James Thompson, the distinguished Scotch mineralogist, indications of gold and silver were discovered in *these* fissures several years ago, which stimulated further search, re-

sulting in the discovery of the large fissure veins which traverse the mountain from east to west, and which is said to average 50 feet wide. The decomposed granite is largely impregnated with gold and silver, and is what is known as a low-grade ore. Veins of silver ore, said to be fully 3 feet in thickness, have also been found in these mountains.

Operations on this property are conducted by the Atlanta Silver Mining Company (formerly the Monarch) and by the Buffalo Gold and Silver Mining Company, which acquired some 500 feet of the central fissure vein. The latter company began operations in 1876, but owing to the lack of reduction facilities, were obliged for a long time to ship the ore to Omaha, the nearest railway station being 260 miles distant. Later, a 10-stamp mill was erected, and up to this date they have extracted about a million dollars' worth of gold and silver, having reached a depth of 652 feet, with 500 feet of adit levels. Hitherto the company have milled only high grade ores running from $100 to $800 to the ton, all the low grade being left unworked, which from frequent assays is known to yield from $15 to $30 to the ton. The new steam hoisting works, with pump, is about complete, which will facilitate the working of the mine. The company's 20-stamp mill has been running for the past two months on ore exclusively from their own mine. Twelve men are employed at the mine, eight at the mill, and ten on the new hoisting works. The total yield for 1884 was about 6,406 ounces of silver.

The Atlanta mine has good hoisting works and a 3-compartment working shaft down 500 feet. The mine is well opened to that depth, and shows continuous ore-chutes the whole distance. A 15-stamp dry crushing mill has been working since December 16, 1884. The ores are silver and gold, in quartz, and are milled by dry-crushing and roasting. Eight hundred tons of ore have been extracted during the year, yielding $70,000.

The Last Chance mine is owned by the Atlanta Hill Gold Mining and Milling Company. It has a level opened about 580 feet, with the larger portion stoped above it. A shaft is being sunk to reach the point below it to drift and open up ground in the floor of the drift. The ore assays, in gold, .656, in silver, .322.

The Tahoma has been successfully worked during the past season and has supplied its mills with ore since July 1. The mine is well opened, showing plenty of good ore, and employs 8 men.

The General Washington is opened by a tunnel and shows from 12 to 18 inches of $40 gold sulphurets ore. The new steam hoisting works, with pumps, are about completed, which will facilitate the working of the mine. The company's 20-stamp mill has been running for the past two months on ore exclusively from their own mine. Twelve men are employed at the mine and 8 at the mill and 10 on the new hoisting works. The total yield for 1884 was about 6,406 ounces.

Hailey district.—About 5 miles above the town of Hailey Deer Creek empties its waters into the Wood River. Situated on this stream are the Davitt and Silver King mines, which are owned by one company and operated together. The shaft has been sunk upon this property some 90 feet, and is still being sunk. The mine is provided with excellent steam hoisting works, suitable buildings, and is producing some ore. Near by there are several promising claims, among which are the Montana, Silver Moon, Mountain View, and Wolftone. In a gulch of the same name is situated the Narrow Gauge group; the mines are owned by a Chicago company. A tunnel has been driven on the property to a depth of 550 feet, and a vein 3 feet in width has been struck. The ore is chiefly galena, with some carbonates and chlorides, and has assayed

as high as 600 ounces of silver to the ton. The company employed about 20 men.

In the same gulch is situated the Walla Walla. The mine has a shaft 60 feet deep, with a pay streak at that depth of 3 feet in width. Samples of solid ore have run as high as 133 ounces of gold to the ton. The ore is free-milling white quartz, of which there is a large amount on the dump. Two men have been kept at work during the year developing the mine.

The Cyclops claim has developed a vein of galena 18 inches wide.

The ore of the Red Cloud runs 120 ounces silver and 65 per cent. lead.

Bullion district.—The Bullion has continued a steady producer during the year, and has given employment to some 25 men at its mill and between 60 and 70 at the mine. Ore cars run on a tramway from the mine to the mill, a loaded car raising an empty one each trip. Some 10 tons of first-class ore are daily taken out of this mine, besides double that amount of second-class ore which is reduced at the mill to about one-fifth of its original weight. The best run as high as 200 ounces of silver to the ton and from 60 to 70 per cent. lead.

The Eureka is located in a cañon a short distance from the town of Bullion. It has extensive concentrating works which have just been completed, having a capacity of 70 tons per day. There are five 2-compartment jigs, with the necessary rock crushers, rolls, &c. The ledge has been cut by a 400-foot level, at a depth of about 400 feet, and ore is being stoped which will average about 65 per cent. lead and carries 90 ounces of silver to the ton, About 40 men are employed.

The Mayflower has until recently employed some 80 men, but is now closed down. This mine has made a good showing in the past, having paid several dividends.

The O. K. mine has employed about 20 men during the season and produced some 17,000 ounces of silver and 150 tons of lead.

The Idahoan, lying in the gulch near the town of Bullion, has employed over 40 men in the mine and mill during the season and has averaged a daily production of 30 tons, containing some $200 worth of lead and silver. The second-class ore is shipped by teams to their mill, about a mile distant, which has a capacity of 60 tons a day, although its present average for twelve hours' work is about 8 tons of concentrated ore, averaging 60 per cent. lead and about 100 ounces of silver per ton.

The Point Lookout is operated by 7 men, and has developments consisting of a shaft 45 feet deep and a tunnel just started. The ore averages over a 100 ounces of silver to the ton.

Little Wood River district lies east of Hailey, on one of the forks of Little Wood River. The principal property is the Muldoon mine, which at present has about 600 tons of second-class ore on the dump and in the stopes.

The Eagle Bird, situated in Garfield gulch, has three shafts, the deepest being 35 feet, which shows a good vein of galena ore.

Adjoining are the Winchester and Edwards group, one of which, the Tom Paine, has been considerably developed and shows good ore.

The Infidel, the Bob Ingersoll, and the Bunker Hill form part of the same group, and are good prospects.

The Bob Ingersoll has employed 4 men during the season, and reports the production of about 1,000 ounces of silver.

Upper Wood River country.—A large portion of the information in relation to the mining properties of this country has been furnished by Mr. John B. Hastings, of Ketchum, and from whom I quote freely:

"The smelting works of the Philadelphia Company, located at Ketch-

um, have proved during the past year that smelting can be conducted profitably on Wood River. The company erected during the year three desulphurizing furnaces, and have met with great success in reducing the cost of smelting. On the completion of the Oregon Short Line, to Ketchum a Y was constructed from the railroad to the bullion house. The smelter ran one stack one hundred and forty-nine days during the year and produced 1,400 tons, averaging 240 ounces and valued at $465,000.

"At Ketchum, the railroad terminus, a sampling mill has been built by a Salt Lake company. The various creeks, each of which has its respective mining district, are as follows:

"On the north, Lake, North Fork, Eagle, and Boulder Creeks, the head of Wood River, Sawtooth, and Vienna; on the east, Trail, Elk Horn, and East Fork; and on the west, Greenhorn, Warm Spring, and Smoky Creeks.

"On Warm Spring Creek is located the Allen group of mines, commonly known as the Buzzo Mining Company. The company have employed during the year 15 men and have shipped ore valued at $25,000, 120 tons averaging about 160 ounces silver and 65 per cent. lead. The concentrating works, having a capacity of 25 tons per day, were erected at a cost of $6,000, and are run by water-power.

The vein is regular and well defined of a quartz, iron, manganese, and lime gangue in a lime country rock, and is exposed by tunnels, shafts, and cuts for a distance of 2,500 feet.

"In Bassett Gulch opposite the Allen group, in a similar formation, are located the Olympia, Lucky Boy, Black Savage, and Keno, all supposed to be on the same vein. The Lucky Boy shipped 17 tons during the year, value $1,785.

"In the West Fork, a short distance above the Allen group, are the Black Hawk, Night Hawk, West Fork, Yellow Jacket, Ajax, and others. The ore is galena and sand carbonate, averaging 150 ounces silver and 68 per cent. lead. But little work has been done during the year. The Night Hawk shipped 5½ tons, valued at $700. The Black Hawk and West Fork are the property of the Philadelphia Smelting Company.

"In Spring Creek, 14 miles from Ketchum, are the Idaho, Ontario, Black Horse, North Star, Irvine, Queen of the Mountains, Poorman, and others. Of these the most important is the Ontario. The formation is granite and lime. Concentrating works with every facility have been erected and 50 men have been employed during the the summer. Irvine and North Star are the property of the Philadelphia Mining and Smelting Company.

"The Queen of the Mountains has a well defined vein on the surface, with a shaft 130 feet in which the ore will average 6 inches and in the bottom 18 inches. A tunnel has been run on the vein about 250 feet, and lacks 50 feet of tapping the ore chute. The ore averages in value 100 ounces of silver and 65 per cent. lead. The shipments from these claims during the year were, Ontario and North Star 661 tons, value $80,002; Black Horse 147 tons, value $18,216; Queen of the Mountains ¾ tons, value $215.

"At the head of Warm Spring Creek is situated the Silver Star group. he vein is exposed on the surface by shafts 600 feet in length and verages 3 feet in width. The ore is dry, containing native silver as ell as chlorides and sulphurets in a quartz gangue. A tunnel 600 feet ng taps the vein at a depth of 300 feet and is about 10 feet thick,

about 15 per cent. being galena, assaying 65 ounces silver and 70 per cent. lead.

"The Deer Trail, one of the most promising prospects in this locality is owned by J. W. Platt and Francis Lemon. They built trails, cabins and laid in timber and supplies for the winter, and paid a $1,000 mortgage on the property by selling the ore extracted by 2 men in one month, about 30 tons, value $5,000.

"Lake Creek, 4 miles up Wood River, was not a shipper in 1884.

"The Alpine, Homestake, Merrimac, Dixon, and Argonaut are on the same vein, which is exposed for 7,500 feet by shafts and cuts, and averages 5 feet in width. The ore varies from an inch to 5 feet and assays 55 ounces silver and 40 per cent. lead. The companies owning the claims have already started development work. The Alpine let a contract for 200 feet of tunnel, which is nearly finished. Four men are at work on the Dixon and Argonaut.

"On Eagle Creek considerable interest was occasioned by the working of the Blue Jacket. The lode can be traced for a mile and a half and is generally supposed to be the same as that described on Lake Creek. The ore is brown hematite, assaying from 20 to 500 ounces silver, 40 to 50 per cent. iron, a small percentage of lead, and about 5 per cent. silica. In running an 80-foot tunnel the production amounted to 236 tons, valued at $7,000. The first extension in running a tunnel 30 feet long took out $500 worth of ore.

"Boulder has verified the anticipations of last year. The Ophir was opened last summer by one small tunnel 50 feet long, from which $8,000 were shipped; this year another tunnel was run under this, the ground stoped lay between the two. In the lower tunnel the winze is down 60 feet, and in the bottom is a 2-foot vein of ore, averaging 130 ounces silver, 2 ounces gold, and 60 per cent. lead. In other places the gangue of quartz and iron will average 40 ounces silver."

Mr. Camp reports that this mine has been shipping 3 tons of ore daily to the Hailey Sampling Works, which netted over $200 per ton and that the output during the year was 115 tons, yielding about 150 ounces of gold, 18,400 ounces of silver, and 75 tons of lead, and employing about 8 men.

"The Yankee Blade adjoins the Ophir and is a parallel vein of the same character and grade of ore. It shipped during the year 5 tons valued at $1,220.

"Below this is the Sultan, which shipped 10 tons, valued at $2,500 being the result of the working of 5 men for six weeks.

"The Dora, Trapper, Bazouk, Belcher, and Rebellion are promising claims. Twelve miles above Boulder and 24 miles from Ketchum is the small town of Galena, at the head of Wood River, where there are many favorable looking claims, the most important of which are the Senate Acajutla, and Highland Chief. The Senate, managed by E. A. McCulloch, expended about $5,000 in prospecting this year, and produced about $3,000 worth of first-class ore. The vein is very large, in some places from 10 to 13 feet, and averages 20 ounces silver and 2 per cent lead, with a heavy percentage of iron oxides. The Galena averages 90 ounces silver and 65 per cent. lead.

"The Acajutla employed about 5 men for three months and shipped considerable ore. Houses and trails were built preparatory for extensive development in the spring. The ore is high grade, from 250 to 500 ounces per ton.

"The Highland Chief has ore to the value of about $2,000 lying on *the dump*, and apparently more of it in the mine. About 12 miles by

wagon-road from Galena are the Sawtooth and Vienna districts and respective villages. The formation is granite, with well-defined quartz lodes. The ore is antimonial silver, sulphurets, and chlorides.

"The Pilgrim and Ruby are being worked by lessees this winter.

"The Columbia and Beaver worked a small force in the summer.

"J. D. Murphy is working the Atlanta group with success, but awaits the result of trying to concentrate the Silver King ore before shipping his own. The latter company erected a $20,000-concentrator to work their ore.

"At Vienna the Vienna Mining and Milling Company employs about one hundred and twenty men the year round, and have shipped during the past year probably $200,000 worth of bullion.

"The Solace, owned by Haggin and Hearst, is claimed to be the best mine in this section, and has a large amount of high-grade ore.

"The Emma struck its ore chute late in the fall, and about the last of the year, from lack of room on the dumps and in the mine for the ore extracted in simply prospecting, reduced their force from eighteen to three men.

"The Maud S, recently located and operated by James Moore, of Vienna, has a well-defined vein of quartz 3 feet thick. A tunnel run on the lode is now 100 feet below the croppings, the last 45 feet having been through 16 and 18 inch ore, assaying 75 ounces silver. Five men have been employed on this property.

"On Trail Creek work on the Lavinia still shows a 3-foot vein, assaying 30 to 120 ounces silver and 70 per cent. lead, but not in quantities to pay expense of working.

"Four men are at work on the Mattie group, which shows a large vein of silver and and 10 per cent. lead, with nuggets of ore assaying from 300 to a 1,000 ounces silver. Ten tons of ore are sacked and 10 tons in bulk on the dump.

"In Elkhorn Gulch the Elkhorn has been as formerly the main producer, the output for the year being 2,120 tons, averaging 87 ounces silver and 40 per cent. gold; gross product, $246,343; net dividends, $102,000."

Mr. Camp reports the production of the Elkhorn group during the year to have been 283 ounces of gold, 183,403 ounces of silver, and 850 tons of lead, and states they gave employment to 20 persons for three hundred and twenty days.

"One of the most successful mines of the season is the Parker, situated about a mile above Elkhorn. The vein is exposed 500 feet in length and 450 in depth, in quartz 5 to 8 feet between walls of lime. The ore varies from a mere knife seam to the full width of the vein, and its value equally so, though never going below 110 ounces of silver and 40 per cent. lead. The following is the company's statement of the production and disbursements of the company during the year:

Total production	$166,889 34
Dividends	79,345 42
Labor, freight, &c	84,789 49
Balance on hand	2,724 23

"Considering that this is the first year that the mine has been operated, this is quite a remarkable exhibit.

"The Noonday Company employed only 3 men for four months. Their shipments amounted to 35 tons, valued at $5,570, the average assay being about 130 ounces silver, and 65 per cent. lead.

Mr. Camp reports that a strike was made on the Buckhorn mine which

adjoins the Noonday, on Elkhorn hill in the upper tunnel, at a depth of 75 feet from the surface; that a vein was disclosed, 6 feet wide, about 2 feet gray copper ore, carrying 180 to 200 ounces silver and 65 per cent. lead per ton.

"Five men have been employed continuously on the E. C. Ray, adjoining the Elkhorn.

"The Quaker City, operated by Professor Jenny, is similar in character to the Parker, and has shipped during the year ore worth $3,817.

"The Gondola shipped $291.50.

"The Baltimore and Victoria group, owned in Salt Lake, have been merely opened by a small force for the past eighteen months and no endeavor has been made to ship ore except such as was necessary in driving drifts and tunnels. The vein is about 6 feet in width and has been opened up about 600 feet in length and 300 in depth.

"The Triumph group, discovered in May, 1884, has shipped about 50 tons of ore, valued at $9,000. The ore chute is 4 feet thick, but no vein.

"North Star, owned by the Philadelphia Mining and Smelting Company, carries a heavy percentage of arsenical iron pyrites, mixed with galena and gangue. A concentrator was erected to treat this class of ore, which has been a success. The lode is spoken of by the manager as being a zone 100 feet thick. The ore-streaks are 80 feet apart, and have been continuous for 400 feet, while cross-cutting shows bunches of ore lying between them.

"The Pride of Idaho, on the east fork of Wood River, about 7 miles from Ketchum, has a vein exposed on the surface for 700 feet, and by tunnels for 300 feet in length and depth. The ore ranges as shipped from 250 ounces silver to 70 ounces, and 70 per cent. lead. Concentrating ore shows everywhere in the mine; 50 tons of first-class ore, valued at $6,250 and 50 tons of second-class ore, valued at $1,000, was the year's output. Eight men were employed during the year."

Mr. Camp reports the production of the Pride of Idaho as 100 tons of first-class ore that netted the owners $217 a ton.

Opposite the East Fork Gulch, are the Occidental and Imperial, which are worked in a small way by the owners and have produced some ore.

The 20-stamp mill put up by the Big Lode mine, also called the Leonora, made a short run during the year, but the results were not satisfactory.

Sawtooth district comprises the mining section situated on the extreme headwaters of the Salmon River and derives its name from the craggy peaks of the mountains bearing the same name. The geological formation of the country is a very fine feldspathic granite. The veins are in a granite rock, well defined, strong, and permanent. The silver is in the form of sulphides.

The Fulton mine has a tunnel alongside the ledge for 75 feet, and where the ledge has been cut it measures 6 feet across. The mine is located in Fulton Mountain, 5 miles from the town of Sawtooth.

The Lucky Boy is shipping its ores to the Vienna mill. This mine and the Columbia are owned by the Columbia and Beaver Mining Company. Several new discoveries have been reported from the camps during the year which were extensively developed. The reducing capacity per day of the mills, concentrators, and smelters, in Alturas County may be stated as follows:

Bellevue Smelting Works	tons..	5
Ketchum Smelting Works	do...	120
Galena Smelting Works	do...	30
Little Wood River Smelting Works	do...	60

Vienna Company's mill	tons	50
Atlanta Company's mill	stamps	15
Buffalo Company's mill	do	10
Minnie Moore Concentrator	tons	80
Queen of the Hills Concentrator	do	50
Hailey Concentrator	do	40
Wood River Company's Concentrator	do	60
Mayflower Concentrator	do	60
Idahoan Concentrator	do	60
Narrow Gauge Concentrator	do	40
North Star Concentrator	do	40
Buzzo Concentrator	do	40
Ontario Concentrator	do	40
Silver King Concentrator	do	30
Little Wood River Concentrator	do	30

Mr. Sydney L. Wright, the vice-president of the Philadelphia Mining and Smelting Company, has very kindly furnished me with the following information, drawn from the books of the company, showing the amount handled by his company of the product of a large number of mines situated in the Wood River country:

"I hand you statement showing, in detail, the silver and gold production for 1884 of one hundred and eleven different mines and prospects situated on and adjacent to the Wood River, Idaho Territory. I think a fair estimate would place these figures as about *one-fourth* the entire production of the Wood River region.

"This 335,042.43 of silver represents 3,864 tons of ore smelted at our works at Ketchum, averaging 86.63 ounces per ton. You will notice that but few of the mines are credited with the production of gold. This is because only these few mines produce gold in sufficient quantity to make it worth while to assay, while, as a matter of fact, nearly all the ore in this region has traces of gold."

Silver and gold production for 1884 *of one hundred and eleven mines situated in Wood River mining district, adjacent to the smelting works of the Philadelphia Mining and Smelting Company, Ketchum, Alturas County, Idaho.*

Name of mines.	Silver.	Gold.	Name of mines.	Silver.	Gold.
	Ounces.	*Ounces.*		*Ounces.*	*Ounces.*
Alvia	56.55	.....	Galore	3,897.73	.....
Allan Groupe	4,208.02	.....	Garfield	149.18	.....
Alturas	484.47	.....	Gray Copper	693.90	.....
Argent and Illinois	639.36	.....	Hailey Concentrates	5,149.85	.....
Ajax	334.19	.....	Horn Silver	1,160.88	.....
Black Hawk mine	2,197.26	.....	Hamburg	1,236.92	.....
Brasher	10.95	.....	Imperial	1,641.24	.....
Black Horse	7,171.81	.....	Idaho	238.99	.....
Bay Horse	114.51	.....	Independence	1,859.24	.....
Blue Jacket	4,371.63	.....	Idaho Democrat	2,777.12	.....
Bullion	251.46	.....	Isabella	306.67	.....
Bob Ingersoll	243.19	.....	Idahoan	3,894.97	.....
Baltimore and Victoria	3,132.36	.....	Justice	36.57	.....
Bay State	1,719.59	.....	Jeffers Consol	317.81	.....
Bullwhacker	527.28	.....	Japan	102.26	.....
Bellevue King	1,195.31	.....	Kitty Hash	80.92	.....
Blue Bird	61.74	.....	Keno	492.40	.....
Caledonia	235.66	.....	King of the West	1,310.85	.....
Crysolite	162.05	.....	Lone Star	369.50	.....
Climax	2,540.60	.....	Leon	293.94	.....
Cross	133.47	.....	Lucky Boy	252,71	.....
Desseret	201.24	.....	Mountain View	2,484.36	.....
Deer Trail	5,955.62	.....	Montezuma	923.88	.....
Deadwood	231.86	.....	Money Bags	122.56	.....
Dean	392.30	.....	M. Jacobs	589.36	.....
Ervin mine	7,760.08	.....	Minnie Moore Tailings	89.00	.....
Elkhorn mine	139,938.57	219.236	Mott and Brinton	760.96	.....
Emma	484.09	.....	Martin Curran	2,227.54	.....
Eureka	67.24	.....	Mott Mayflower	246.29	.....
Emma Fair	248.47	.....	M. Barry	17.16	.....
Eastwood	63.02	.....	Midas	251.45	.....

Silver and gold production for 1884, *&c.*—Continued.

Name of mines.	Silver.	Gold.	Name of mines.	Silver.	Gold.
	Ounces.	*Ounces.*		*Ounces.*	*Ounces.*
May Bell	79.61		Rattler	243.69	
Minerva	493.01		Red Elephant	1,763.20	
Montana	90.18		Rose Bud	19.25	
More	233.78		Snow Fly	1,558.92	
Mayflower	5,206.35		Shark	253.09	
McCanter	248.42		Silver King	800.44	
North Star	9,681.48	4.467	Si-Lee	66.62	
Night Hawk	225.75		Sunny South	130.67	
Nay Aug	76.81		Sarah	90.14	
New Comet	648.04		Stinson	52.15	
Narrow Gauge	576.47		Sheep Mountain	1,067.28	
Ontario	48,160.19		Sam Friend	513.18	
Ornament	1,768.47		Snap	311.94	
O. K. Dump	3,298.68		Sultana	293.37	
Ophir	5,036.50	29,829	Stocking	179.87	
Olympia	977.01		Topsy	113.84	
Ohio	1,086.21		Taylor	184.40	
Overland	1,129.62		Triumph	3,029.59	
Paymaster	65.48		Veta Grande	199.55	
Parker	11,480.43		Valley View	5,235.38	
Point Lookout	1,049.76		West Fork	778.67	
Poplatch	58.59		Wolftone	3,270.79	
Pride of Idaho	1,285.98		Yankee Blade	881.00	10.
Pinyon	261.16				
Queen of the Mountain	140.31	.062	Total	335,042.43	264.
Quigg	1,484.90				

BOISE COUNTY,

which originally included the county of Ada, has an area of 3,30 square miles, and has been noted in mining history chiefly for it placers.

The principal placer grounds worked at present are owned by Hon Ben. Wilson, of Pioneer, one of the first in that locality to introduc hydraulic mining. He now controls forty ditches, aggregating over 10 miles in length and covering nearly 20 miles of mining ground. H runs nine giants, two derricks, and one saw-mill.

Mr. K. P. Plowman's gravel claim on East Hill, near Idaho City, worked by a little giant hydraulic, and is estimated to have yielde during the season $25,000.

Paul Buzzini & Co.'s gravel claim is located on the hill-side south Moore's Creek, a short distance below Idaho City. The gravel is feet deep, and their claim is about one-half mile in length and fro 400 to 600 feet in width. They have been during the past season em ploying from 9 to 12 men, with a result of 950 ounces of gold, equal $16,675. The firm paid out for wages, improvements, &c., $8,078.

Dr. W. B. Noble has a claim at the head of Grimes's Creek, on whi there are two ditches, one 2 and the other 3 miles in length. The is in connection with the works a saw-mill which manufactures all t lumber needed. Day and night shifts are being constantly work through the season while there is water.

On Ophir Creek, near Placerville, is located Henry Reed's hill clai The gravel is from 10 to 60 feet deep. Two machines are at work one for washing and one for cleaning up. The water is carried fr Ophir Creek through a ditch 6 miles in length. This season Mr. Re has employed 13 men at an expense of about $2,400. The yield of g was 602 ounces, valued at $10,595.

B. F. Channel's claim is at the head of Willow Creek, near the su mit between Idaho City and Centerville. The claim has for seve years yielded about $10,000 per season.

East of Placerville is the Granite Creek Ditch Company's claim. The gravel bank is from 25 to 40 feet deep; it is worked with "little giants." The Ranch Company work a large claim on Granite Creek bar. These two companies are virtually the same corporation, and the yield of its two claims has this year amounted to from $15,000 to $20,000.

Not far from Placerville is the claim of Mr. H. Ashcroft, employing 2 persons for eighty days, or so long as his ditch carried water. This is the finest gold in the county, running over .900 fine; the yield for the season was 90 ounces.

A Chinese company is working a claim in the bed of Granite Creek. It has been worked for fifteen years, and has produced an estimated yield of $25,000 per year.

There are many individual placer claims in operation around Idaho City, Centerville, Placerville, &c. These claims are generally producing a fair yield, but to obtain accurate and reliable information is quite difficult, so that the aggregate can only be estimated.

Wells, Fargo & Company's agents at these towns report the gross amounts of shipments as $589,215.55.

With the decreasing yield of the placer mines, more attention has been given to quartz mining.

Banner district.—The Elmira Company has during the past season crushed 954 tons of silver ore from its mine, which yielded $70,000. The ore worked was taken out nearer the surface, the work being carried on upward by the opening of new stopes above the lower level.

This company owns a group of mines consisting of the Banner, Crown Point, Wolverine, Idaho, Star of the West, and Washoe. In the Banner the pay chute is over 500 feet in length. There are two veins; the tunnel struck one 15 inches wide at a distance of 871 feet; 8 feet farther it struck another which varies from 6 to 15 inches in width. The first vein dips to the south, the second to the north. Theore is chloride, occasionally containing black sulphurets, antimonial, ruby, and native silver.

The Crown Point is open to a depth of over 400 feet. The average assays from these mines are as follows:

	Ounces silver.
Crown Point and Wolverine	70
Banner	40
Idaho	50
Star of the West	70
Washoe	50

At the works the company have a 20-stamp mill besides roasters, assay office, &c.

The Deer Lodge is a comparatively new discovery; three assays are reported as follows: No. 1, $210.25; No. 2, $374.50; No. 3, $1,351.98. The average of the rock, taken from wall to wall, was $312.21. Other locations in the neighborhood are the Monarch, average assay, $219.12; Homestake, $230.19; Daisy, $67.54. The Comet is an extension of the Daisy, and the North West of the Homestake.

Several locations have been made near the headwaters of the Payette; principal among these are the King of the Forest, Summit, Julia, Mammoth, Romeo, and Benaune. On the Payette and its tributary, Squaw Creek, are Mr. A. G. Church's placer diggings, which in 1884 produced about $3,000. Several other individual placer mines have been located in this section, but reports of the amounts of their production have not been received. The estimated yield is $5,000.

Quartzburg district, north of Idaho City, has been producing gold since 1867. The principal mines are the Gold Hill, Yellow Jacket, Pio-

neer, and Iowa, the first three named being the property of the Gold Hill Gold and Silver Mining Company, running southeast for a distance of 2,900 feet and northwest of the Discovery shaft 1,400 feet. During the season 75 men have been employed, and for 1884 the production was about $50,000. There is on the property a 25-stamp mill, which reduces the ore at a cost of $1.25 per ton. The bursting of the pump used for hoisting water from the lower level necessitated the shutting down of the mine in November, 1884. The character of the ores from the Gold Hill mine is decomposed sulphureted quartz, which only frees a small percentage of gold without roasting. On the dump are at least 5,000 tons of ore which will assay from $17 to $50 gold per ton. With the advent of cheaper transportation these tailings will be properly worked by roasting, &c.

The Centennial and the Belshazzar are in this district, the latter having about 200 tons of ore on the dump, most of which will assay well. The ledge is 15 feet wide, and a large portion of it is uncovered.

In *Gambrinus district*, about 8 miles from Idaho City, is located the Forest King mine. It is on a 20-foot ledge, cut with paying veins of gold-bearing quartz, averaging from $25 to $30 per ton. A new 5-stamp mill has been erected, and although only started in November it turned out before the close of the year over $9,000. A streak of silver-bearing ore a foot wide was recently struck in a drift 50 feet west of the face of the main tunnel. On both sides of the main seam are numerous small ones which dip toward the vein. The east drift has been driven 40 or 50 feet from the main tunnel. The ore in this drift has been in bunches, and prospects well in gold.

The ore of the Golconda and Silver Chief is very refractory. At the Golconda mill, in a clean-up of 70 tons of ore, the value was estimated at $40 per ton. The 5-stamp mill crushes 10 tons of ore in twenty-four hours. Thirteen tons of ore taken from the Silver Chief mine this fall were milled by the Elmira Company and produced a bar worth over $1,400.

The Trade Dollar is a new discovery, having been located late in the fall of 1884. Its ores assay at $41 gold and $55 in silver.

The Mammoth, on Summit Flat, produced gold-bearing quartz of the same character as that of the Forest King. During the year 1884 $60,000 was taken out by a small force of men. The vein averages about 2 feet in width. There is on the property an 8-stamp mill. These ledges are all in contact between porphyry and granite.

Deadwood Basin includes some placer and quartz locations, among which are those of Mr. Weiss. The yield of the basin during 1884 will not exceed $2,000 in gold. The quartz locations so far have been only prospected.

CASSIA COUNTY.

This county, lying east of Owyhee, is bounded on the north by Snake River. Being principally a stock-raising county, with some agricultural interests, its mining resources are confined to placers on Snake River, which, with a few exceptions, are operated by Chinese. The estimated amount of gold produced in 1884 was $5,000.

CUSTER COUNTY.

Bay Horse district.—In the Excelsior mine the ore body has an average width of about 7 feet. The present working tunnel is 145 feet below the upper tunnel and 350 feet down from the topmost workings in the

ne. Average returns from all ore shipped to the Clayton smelter up date this season were 103 ounces silver and 34 per cent. lead. A ce of 26 men is employed, and the daily output has been from 12 to tons.

On the Davitt, so far as opened, the pay streak is not very large, ning from a few inches up to a little over a foot.

The Ibex, on the same vein as the Davitt, has two tunnels, and a ift leading from the upper tunnel nearly to the lower one. The tun- ls are about 40 feet apart, and both run in on the vein 100 feet in all. e work done on the vein was for exploration, but there is consider- le ore on the dumps. No large shipments have been made.

The Post Boy is opening a vein of great width, and very rich ore has en taken out.

The Beardsley is being pushed in the way of development work.

The Silver Creek is situated on the north side of Bay Horse Creek. A nel has been run for the distance of 175 feet on the line of the ledge, th more or less ore the greater portion of the distance. For 40 feet e vein and ore were very marked, while at the end of the recent work- gs the vein was 6 feet wide, 3 feet of it a well-defined galena and gray pper ore.

The Bullion, situated on the south bank of Bay Horse Creek, will prob- ly prove to be on the same lode. The vein is about 3 feet in width id is well filled with galena streaks and carbonates. Two men are ployed in taking out and sacking the ore, of which about 3 tons per y of the better quality are being mined.

The Ramshorn smelter has been running steadily, and there is still the ground a large amount of ore. The ore is of superior grade, ough somewhat refractory. It has been decided to increase the power y adding steam. A fine engine is already set in place and the neces- ry building and improvements for its use are being completed.

The Cinnabar, on a south branch of Squaw Creek, runs from 20 to 60 et in width, nearly all silver. The main value is in the galena portion, hich, at the top, was a foot thick and widened to 17 inches at a depth 70 feet. This vein has been followed to the depth of 200 feet, the lena never having left the foot-wall. The galena ore runs from 80 to 0 ounces, averaging 63 per cent. lead. Second-class or iron ore sam- es from 25 to 45 ounces silver, with from a trace of gold to $40. e output of the shaft was $28,000 worth of high grades, and large antities of low grades are now on the dump.

The Old Sam mine, at the head of Warm Spring Creek, lies in the ter of a slate belt about 800 feet in width.

The Fisher mine, on Warm Spring Creek, 16 miles from the Salmon, s a shaft down 110 feet. The vein is from 6 to 18 inches wide in the aft, and carries gold ore. At a depth of 30 feet levels have been run m the shaft aggregating 130 feet. West of the shaft 800 feet a tun- l has been run 300 feet on the ledge through a chute of ore 4 feet in ent, and assaying $64 per ton. The face of the tunnel is 115 feet m the surface. During the summer a 5-stamp mill was erected which s been running most of the time.

In the great basin on the north side of the Sawtooth range of mount- ns, at the head of Valley and Cape Horn Creeks, a number of prom- ng prospects have been discovered. The ledges so far are from 100 200 feet in width, and the ore is chlorides and sulphurets, which runs m 20 to 265 ounces silver and from $3 to $10 in gold.

The Buckskin, the original location, was discovered one year ago. e Wonder mine, on the south of Jordan Creek, and about 1 mile

from Montana Hill, is developing finely. The tunnel is in about 130 feet from the surface. The ledge, struck in a cross-cut, is from 1 to 2 feet in width, and full of ruby silver ore.

At the Clayton smelter there is a constant delivery of ore both from teams and packs, and five bins of ore are awaiting reduction. Two shifts are employed, and an average of 50 bars of bullion of 100 pounds weight is the output of each twenty-four hours. The bullion runs $600 per ton.

The Bull of the Woods, situated on Ramshorn Hill, is opened by four tunnels 850 in length, with a few cross-cuts, winzes, and raises. The vein, which carries seams of high-grade ore, runs parallel to the Ramshorn vein. The ore thus far extracted has averaged 303 ounces per ton in silver, with 30 per cent. copper. Total yield, $91,000.

The Ramshorn group, consisting of the Ramshorn proper, Montreal, Utah Boy, and Post Boy, is located for 4,500 feet on the vein, which is traceable continuously on the surface through the length of the four claims. It is a formation of slate and porphyry with a general direction of northeast to southwest which dips to the west at an angle of from 25 to 30 degrees. Only assessment work has been done on the Montreal. The Ramshorn proper is developed by a system of tunnels with various connecting winzes and raises. About 10,000 tons of ore have been extracted, which averaged about 120 ounces silver per ton and 8 per cent. lead.

The Utah Boy has three tunnels on the vein, averaging from 100 to 400 feet in length.

The Silver King, situated west of the Ramshorn, is developed by 300 feet of tunnels, &c., and has in three years shipped about $100,000. The first-class ore averages 1,000 and the second-class 125 ounces per ton.

The Sky Lark, adjoining, has developed a cross-vein.

Yankee Fork district.—On the Custer mine there is still considerable of the original ore in sight. Thirty-seven hands are employed.

Aside from the Custer Company's mines on the Custer Mountain, there are a large number of prospects, among which are the Continental, Lucky Boy, Annie, General Miles, Black, Vishnu, and others, in most of which are veins of good ore. At present there is little work being done outside of the annual assessments. The camp employs about 250 men. No ores are shipped as heretofore, but are crushed at the Custer Company's mill, which has 5 stamps and a capacity of 35 tons. The mill crushes all custom ores brought to it, but has been running constantly through the winter on ores from the Summit and Unknown mines, with an average yield of from $40,000 to $50,000 per month. There is said to be enough ore in sight to keep the mill employed during the year.

The General Custer Company has been very successful in its operations here, and the yield of the mill has been not much less than one million per year. The bullion contains about one-third gold in value.

The Badger mine is opened by three tunnels, the first 250 feet long, the second 600 feet, and the third 750 feet, besides drifts, winzes, shafts, &c. Product for 1884, $40,275, which was the result of reductions at the Custer Company's mill.

On the Charles Dickens mine, which is now opened to a depth of considerably over 300 feet, the stopes and levels show well, while the deeper workins prove the permanency of the mine. A winze has been sunk to a depth of 60 feet below the floor of the lower tunnel, with levels running east and west, and showing a large body of high-grade ore. Much

the ore sent last season from the Dickens mine to the Custer mill raged over $400 per ton. The higher grade ore is stored in the mine l the lower grade, of which there are some 5,000 or 8,000 tons, is the dumps and in the storehouses, large quantities of ore having n extracted during the past winter. Twelve men are employed, and wages are $4 per day and board. There are three veins on the kens location. Owing to litigation the mine was idle during the mer and fall of 1884.

n Dicken's Hill, outside of the Dickens mine, there has been much k going on all winter.

he Juliet has a tunnel run in on the lower workings 400 feet in th, and striking the ledge. Sinkings have been made to the depth 91 feet by shaft and raise, and there is a drift to the right of the iel, or to the east on the ledge, 55 feet, and to the west 35 feet, and e stoping has been done from the left drift.

hn Carroll is running a tunnel to strike the Daniel O'Connell vein feet from the top of the ledge.

en have been employed all the winter and spring on the Paradise Washington ledges. A hydraulic is at work on the gravel bar on hington Hill, which is paying well, some very large nuggets having found.

ie Montana mine, on Mount Estes, is over 300 feet deep, and at the om shows good ore. The gross yield from 400 tons of ore worked ie Custer Company's mill was $98,000. From 12 to 14 men have employed during the winter.

the Whale mine last spring two rich veins were discovered on the ace; the veins average in width from 1 to 2 feet, and the ore is ted with horn silver, and in places shows free gold. Thirty-five or ons of ore sent to the Custer mill averaged a little over $400 per

innickinnick district.—Among the prominent mines owned and op- ed by A. J. Cook & Co. are the Ella, Overland, Faithful Boy, and itor, all on the same vein, and carrying a few ounces of silver, but worked principally for the iron, of which they contain about 40 per t. They are situated 4 miles from the smelter, on Poverty Flat. s firm also owns the Silver Belle, You Know, and Redemption, and are well developed. The smelter and several mines were purchased this firm early in the year, and the smelter, under the management Mr. Cook, has from June to October worked 1,810 tons of ore, which tained 186,841 ounces of silver.

quaw Creek district.—Four miles above Clayton is situated the Red d, also owned by the same company. A shaft is sunk to the depth of feet, from which 50 feet of levels have been run, all in ore. The ship- nts of ore made during the past season averaged 35 ounces silver l 35 per cent. lead per ton.

East Fork district.—The Germania and Arctic, owned by J. D. Wood, situated on a true fissure vein, in a formation of brown porphyry, l have produced about 600 tons of ore, averaging 150 ounces silver,) gold, and 55 per cent. lead per ton. About one-half mile east is the esus, having a ledge from 7 to 25 feet in width, and cropping out entire length of the claim, which is 1,500 feet. A shaft has been nk 70 feet, which shows ore in the bottom averaging 50 ounces silver,) gold, with from 50 to 60 per cent. lead per ton.

A group of mines one-half mile further east embraces the Bible ck, Idaho, and Tyrolese. The Idaho has shipped 200 tons of ore, as- ing 150 ounces silver and $10 gold, with 55 per cent. lead; the Bi-

ble Back, 100 tons of the same grade, and the Tyrolese, in October, 1884, 30 tons of a similar character. The little work done on these claims shows a true fissure vein and ore of a fine grade.

The Jefferson, Washington, Sautterberg, Sperling, and others have also shipped small lots of ore. The cost of transportation militates strongly against the development of mining properties in this district. Other items of expense, fuel timber, and fluxing material are in good supply and at a reasonable price.

Sheep Mountain district.—On the Mountain King mine a shaft has been sunk to a depth of 50 feet, and the ore improves in richness as depth is attained. Fifteen tons of ore recently packed to the Bay Horse smelter yielded 100 ounces silver and 53 per cent. lead per ton, and there are some 7 or 8 tons of ore already mined. The ore smelted this season, though not assorted, ran over $100 per ton.

The Lucinda is situated about one-half mile below the Mountain King, and the ore assays $100 in silver and 60 per cent. lead.

The Kingston mine has a ledge 3 feet in width and is opened by a tunnel 46 feet long. Ten tons of ore worked at the Bay Horse smelter yielded over $2,000.

The Columbus mine is opened by a cut 30 feet in length. The ledge is 3 feet wide and the ore assays as high as $500 per ton.

The Ruby claim, one mile from the Columbus, has a ledge 3½ feet wide, the ore assays from $85 to $120 per ton.

The Alta Johnson is opened by a shaft 40 feet deep, and promises well.

Mr. Martin Barber's claim has been opened by a tunnel 70 feet long; the ore averages from $400 to $500 per ton.

The Greyhound ledge is one of the first discovered in this district. It is a silver-bearing ledge, 3 feet wide, and can be easily traced on the surface for 750 feet. A shaft has been sunk near the south end of the claim to the depth of 50 feet, out of which 8 tons of ore have been extracted which averaged $145 per ton.

The Blue Grouse is an extension of the Greyhound, about half a mile north. The ore of this mine is low grade, assaying from $35 to $50 per ton.

The Colonel Bernard, Patrick Henry, and Rufus, on which some prospecting has been done, are southeast extensions of the Greyhound. The Seafoam lies 6 miles to the east of the Greyhound, and has been prospected by a 40-foot tunnel, striking in some places very rich ore.

There are probably forty or fifty more prospects in this district, but very little work has been done on them. The district is close to the Middle Salmon River and about 25 miles from Bonanza.

The *Lost River district* is situated upon the Big Lost River range of mountains, distant about 90 miles west from Blackfoot on the Utah and Northern line of railroad. Some of the prospects already developed show every evidence of permanency, and The Black Daisy, in Hamilton district, beyond Little Lost River, is estimated to have over 40,000 tons of galena and carbonate now exposed, although the deepest shaft is only a little more than 100 feet. The pay ore is from 12 to over 75 feet in width. The outcrop is boldly traceable for 1,000 feet, and is like that of the Ingersoll.

Adjoining the Black Daisy are the Alice and Great Northern claims, both of which are fine prospects. The ore is of good grade; wood and water are plentiful, and lime and iron for fluxes are found in abundance. The climate is such that the mines can be worked all the year.

The Copenhagen and Mammoth both show large bodies of ore, par-

icularly the latter, which from the surface to a depth of 75 feet is a ontinuous body of carbonate which will average over 50 ounces. The ast mill run from the bottom gave 90 ounces silver and 52 per cent. lead.

The Copper King group is located on a 600-foot ledge of copper, an verage sample of which from the surface to 55 feet in depth gave 5 per cent. copper and 20 ounces of silver. The group is known as the ig Copper mines, and consists of the Buena Vista, Golden Wave, Ienrietta, Old Judge, and Copper King. The work done consists of everal short tunnels, three shafts 70 feet each, and various drifts. 'rom the bottom of one of the shafts a cut across the vein, 75 feet, was ı ore all the way, and the wall has not yet been reached. One vein is ver 100 feet wide, and immense as are these veins the ore averages ll the way from 1 to 50 per cent. copper, and from 3 or 4 up to 70 ounces ı silver. The veins run nearly north and south and dip with the hill o the east. The west or foot-wall is granite, and the hanging wall imestone. In one of the shafts sinking is being done, from another a rift is being run, and from the third a tunnel is run which will tap the ein at a distance 300 feet from the surface. Twenty men are employed n the property in making these developments.

In Cliff a 30-ton furnace was erected and one engine provided to oper- te the blast and another to run the crushers. Suitable buildings, oads, &c., were provided, and a run was made, turning out 13 tons of opper bullion carrying 112 ounces silver. The product of the ore came p to 97½ per cent. of the assay value. Besides this bullion the com- any produced 2 or 3 tons of matte, and then closed down. The ledge rom which the ore was taken is at one end silicious while at the other t is iron, carrying 13 per cent. copper, and by mixing better results re obtained, the ores fluxing well together. At least one mile of road as been built by the company; good boarding-houses, offices, &c., have een provided, and sufficient work done on the ledges to enable them o continue development all winter.

The Grand Prize is a galena ledge, from which 200 tons were extracted ast fall. A shaft is down 80 feet, and, with machinery on the property, t is proposed to sink 300 or 400 feet. The ore goes about 40 ounces ilver and 50 per cent. lead.

The Mammoth lies west of the above claims, at an altitude of 10,270 eet. Considerable work has been done on it. A shaft is down to the lepth of 90 feet, from which, at a depth of 150 feet, it is proposed to ross-cut. The vein has been cross-cut 14 feet, and levels are to be run. he ore is galena and carbonates, carrying from 40 to 75 ounces silver nd from 30 to 40 per cent. lead. The ledge crops out a distance of ,250 feet, and is from 60 to 150 feet wide, and the formation is granite, ime, and porphyry. A good wagon-road runs within 3 miles of the laim. Water and timber are abundant.

Amos Franklin is shipping ore from the Vicar mine on Lost River to he Bay Horse smelter. The ore is galena, of good grade, and there are everal hundred tons now on the dump. The Vicar is represented by arties who have visited the mine to be the most promising prospect on ost River.

The Knickerbocker promises to develop into a very fine property. he ore is principally carbonate of lead.

The Independence No. 2 shows a fine vein of galena and carbonate of ad. Assays at the surface gave the following: No. 1, 155 ounces sil- r, trace of gold, and 60 per cent. lead; No. 2, 63 ounces silver, trace gold, and 40 per cent. lead.

Among the promising prospects on Lost River are the Hill Top, Grey

Eagle, D. and R. G., Blue King, Steamboat, Eula, Hattie, Standard, and Mayflower. Most of these ledges show a plain iron cap, easily traceable on the surface, and are similar in character to those of Leadville, Colo.

IDAHO COUNTY.

Mr. N. B. Willey kindly furnishes the following in regard to this county:

Warrens district.—"The largest production of gold in this district is by Chinese, who have acquired the principal placer claims. Five companies in Warrens own claims adjoining on what is called the Meadows, comprising 200 acres. Work has been steadily carried on for eight or ten years, and the ground is far from being exhausted. The production was for last year as follows:

Took Sing Hung	$17,700
Wing Wa	4,000
Lin Wa	16,200
Shin Lee	11,000
Hung Wa	8,800
Total	57,700

"Aside from these companies, about 40 Chinese have mined in a small way in various gulches and creeks. Their production may be roughly estimated at $8,000.

"About 25 white men have also been engaged in placer mining in the the camp, including two companies of importance. Their yield may be estimated at $17,000. Three quartz mines have been actively worked during the year.

"The Little Giant is the leading producer. It is developed by two tunnels, one tapping the vein 60 or 70 feet deep, and the other 70 feet lower. The ledge matter is from 1 to 3 feet in width, and the pay ore on the foot-wall is in a sheet from 1 to 14 inches in width. This mine is remarkable for the high grade of its ore, that thus far taken out and worked has yielded over $200 per ton. The reduction works consist of a 5-stamp mill at the mouth of the tunnel, run by water-power, and having all the necessary appliances.

"From the Tramp mine ore has been taken out and crushed during the summer. The yield was from $16 to $40 per ton. The vein is from 8 to 30 inches in width, but the mine is unfavorably situated.

"The Knott mine is owned by N. B. Willey, and gives employment to from 5 to 10 men. It is opened by tunnel to a depth of 120 feet, and preparations are being made for a tunnel 100 feet lower. The vein is from 2 to 6 feet in width; the ore is hauled 2 miles. A 5-stamp mill, run by water, is in operation about five months in the year. A double 12-foot arrastra is also connected with it, and the sulphurets are saved upon blankets. The yield averages $15 per ton.

"The Alden is owned by N. B. and S. A. Willey. Various shafts and open cuts, none more than 30 feet deep, have opened up the ledge for about 600 feet. The rock-work has yielded from $8 to $17 per ton. The vein is from 8 inches to 2 feet in width, and the mine is advantageously situated for working.

"The Keystone, owned by C. A. Bemis, is opened by cuts and tunnels for nearly 1,000 feet. The vein is narrow but rich, all the ore worked having paid from $45 to $116 per ton. The pay rock is now mostly taken out down to the water level.

"The yield from the quartz mines of the district may be placed at

)18,700 in gold. There are in the district many lodes carrying silver)res assaying from 10 to 50 ounces per ton. The ores are free milling,)o base metals nor rebellious ores being ever encountered. In the ab-)ence of a plant suited for their reduction only small lots have been)orked from time to time, which have been roasted or calcined in heaps)ith large quantities of wood, and then put through a battery or ar-)astra, with a view to saving the metallic silver that appears. As high)s $50 per ton have been obtained by these means, and it is supposed)hat about 10 per cent. is saved.

"The Charity, owned and operated by P. & J. Reibold, has been)rospected by tunnels to a depth of 210 feet, the lowest tunnel being)00 feet in length. The present workings are confined to the upper)evels. The reduction works consist of a 5-stamp battery at the mouth)f the tunnel. There is a large amount of low-grade ore with rich)ockets here and there. The average yield is from $10 to $12 per ton.

"The President is a recent discovery; the vein is from 6 inches to 2)eet in width, and the ore pays from $17 to $40 per ton. Both ore and)ountry rock are soft and easily worked, and the ledge lies favorably)or development. The ore is worked in custom mills.

"The Rescue is the most extensively developed mine in the district. A tunnel taps the vein at a depth of 183 feet, at which point a shaft)ises to the surface. The hoisting works are of a capacity sufficient to)ink to the depth of 600 or 700 feet below the tunnel level. The shaft)s already 120 feet lower, and two levels are opened.

"In *Florence district* about the usual amount of mining has been done)uring the year by 60 or 70 Chinese and a dozen or twenty white men. No quartz mines have been developed. The yield may be estimated at)40,000, all gold."

The Gold Lake Mining Company's claim is an alluvial placer, worked)y hydraulic piping under the superintendence of Mr. Michael Dasey. The gold is of low grade, worth less than $14 per ounce.

The Meadow Creek Mining Company employed 4 persons from twenty to one hundred and fifty days; yield about $1,800.

The Buchanan Mining Company employed 4 persons about one hun-)red days; yield about $3,000.

Duffey & Co.'s claim, with 3 men employed about one hundred days,)roduced $1,500.

Tom Clark's claim has been worked irregularly during the season;)ield about $1,000.

John Welch's claim yielded about $200.

There are various other claims owned by different parties whose esti-)nated yield has been about $5,200.

Mr. Willey continues:

"In *Elk City district* considerable interest has been manifested)uring the summer in quartz mining; nothing, however, amounting to)n excitement. A mill is being erected, the machinery having been)aken into camp before the snow set in. A number of gold-bearing)eins have been more or less developed. The placer ground is mostly)n the possession of Chinese, and has been more profitable than usual. The yield has probably amounted to $45,000.

"*Salmon River district.*—On Salmon River the leading bar claim is)wned by Small Brothers and others, at Slate Creek. It is supplied)ith water by a ditch 5 miles long, carrying from 1,000 to 2,000 inches)f water all the year; from the ditch the water is conveyed to the claim)y a large iron pipe some 1,700 feet long, and is then placed by a large monitor where it will do the most good. This is considered the best

appointed placer claim in the Territory. The owners have invested a large amount of money and are now beginning to realize some return. The production for the year is estimated at $15,000. Various other bars are also worked in a small way, the yield of which is given as $50,000 gold.

"*Meadow Creek district.*—The Bullion and the Fortune were located on the old Harpster and Little Ledge. During the year only development work has been done, at an expense of about $200. The vien shows about 4 feet in width, and the ore assays up to $2.50 per ton in silver, and from a trace to $6 per ton in gold."

KOOTENAI COUNTY.

But little mining has been done in this county, consisting principally of placer mining on Sullivan Creek and Pen d'Oreille River. No reports of the amount produced have been received.

LEMHI COUNTY.

Placer mining has been carried on for many years on Nappin's Camp, Rapp, Arnett's, and Big Creeks, as well as on the bars and gulches tributary thereto.

Since 1873 individual workings have been absorbed by large companies, who have produced from $300,000 to $400,000 annually.

Leesburg district is a placer mining district, and is connected with Salmon City by a fair wagon road.

Daly Creek district is adjacent to the Leesburg.

In *Moose Creek district*, about 2 miles southeast of the placer claims, is the Shoo-fly, a quartz mine from 10 to 12 feet in width between walls. The ore has yielded, on an average, $40 per ton. Work on this vein has been prosecuted in a desultory manner, development being pushed for one season and then only assessment work during the following one or two seasons. The retort value of the mill runs shows $19 per ounce. A 5-stamp mill, a part of the improvement on this property, has produced $30,000.

The North Fork or *Dahlonega mining district* is situated about 40 miles northwest of Salmon City. The mines of this district are on true fissure veins from 3 to 9 feet wide carrying free gold-bearing pyrites. The ore yields from $20 to $180 per ton, and is not refractory.

Among the many quartz lodes in this district to be mentioned are the Huron, Oneida, Rose, Keystone, Sucker, Eureka, Golden Circle, Twin Brothers, Bill Edwards, McCarthy, Monster, Mammoth, Montgomery, Saint Jo, and a 10-stamp mill, with chlorination works of a capacity of 10 tons per day, and six arrastras furnish the reduction machinery for the ores.

Mineral Hill district is situated about 45 miles northwest of Salmon City, in which is located the Kentuck mine. This is on a well-defined vein, which has been traced for more than 4,500 feet; average width, about 7 feet, in quartz, and assaying from $175 to $1,500 per ton.

The mine is opened by 350 feet of tunnels, with connecting shafts. On the same ledge is situated the Grunter mine. A cross-cut has been run on the vein, which had cut one wall and advanced 30 feet, all in ore; no other wall in sight. Assays show a value of from $50 to $1,200 per ton. A 10-stamp mill was in operation sixty days, during which time bullion enough was produced to pay the cost of the mill and of the other improvements.

Yellow Jacket district is about 60 miles west from Salmon City and

braces the North and South American claims, located on parallel ges, showing croppings from 30 to 40 feet in width, which have been ced for a distance of 2 miles. Developments consist of tunnels, ifts, and drifts many hundred feet in extent, exposing large bodies free gold ore, running from $10 to $45 per ton.

The North American extension shows a large body of ore, assaying m $15 to $25 per ton. The country rock is porphyry.

About 10 miles from Yellow Jacket is the Prairie Basin, in which a nber of promising mines have been discovered, including the Watch-rer, Monument, True Blue, and Bobtail.

Lemhi district is about 85 miles east of Salmon City, and contains the ola mine. This is a vast vein of carbonate and galena ore, about 60 t in width, carrying from 40 to 70 per cent. of lead and from 30 to ounces silver per ton; 2,500 tons of ore per month have been shipped m this mine to the smelters at Kansas City, Omaha, and Denver. l the workings are in ore and it is estimated that there are over 000 tons in sight. This mine has produced nearly half a million dol-s in less than two years.

Spring Mountain district lies about 75 miles from Salmon City, in an sterly direction. The mines of this district yield heavy carbonate d galena ores, ranging from 45 to 120 ounces silver and from 30 to per cent. lead per ton. Over one hundred claims have been recorded, ny of which have been fairly opened and have plenty of ore on the mp ready for the smelter.

The Spring Mining Company has erected a 30-ton water-jacket smel-

Texas district is situated about 65 miles from Salmon City. The ores of the same character as those of the Spring Mountain district, in ne cases running as high as 500 ounces in silver per ton. Iron and estone abound, and can be procured at very small expense for flux-g purposes. A 20-ton smelter and concentrator are in course of erec-n.

In *Blue Wing* or *Pahsamari district*, about 60 miles southeast of Sal-n City, forty or fifty claims have been located. The general char-er of the ore is silver chloride, assaying from 50 to 240 ounces to ton.

Salmon City district.—Included in this district are Silver Star, Free-n, California, Washoe, Ranger, and El Dorado. The ore of all these nes is similar in character and richness. The Silver Star is about miles north of Salmon City. Its ore is contained in three large imneys, and it is estimated that 12,000 tons are in sight above the ound. Very little work has been done below the surface; the ore ries from $20 to $30 gold per ton, and can be mined and milled an expense of $7 per ton.

The Ranger mine is some 18 miles east of Salmon City. The El Dorado, hin sight of the Ranger, is on a 6-foot vein, and mills $10 per ton. wire tramway and a first-class 20-stamp mill have been erected for purpose of working this mine and the Ranger.

The Freeman is 18 miles north of Salmon City; the California is 1 le west of the Freeman; the Washoe is a strong vein of free-milling d quartz, about 3 feet wide, from which assays have been obtained ning $40 per ton.

NEZ PERCÉS COUNTY

ows no mines but placers; from these, worked exclusively by Chi-e, it is estimated $500 will cover the whole production for 1884.

ONEIDA COUNTY.

Reliable information from this county is of the most meager character. In the vicinity of Eagle Rock there are some placers on Snake River worked by Chinese, and near Oxford, and on the Indian reservation near Pocatello deposits of copper have been found. These prospects, however, have not been developed to any extent.

Caribou district is situated 35 miles from Soda Springs on the Oregon Short Line, with which it is connected by a wagon road. Gold from this district is the finest in the Territory, assaying .970 fine.

The placers of Clemens & Moore produced about $3,000, and those of Hezekiah Moore about the same amount; the latter have been leased to, and, in common with the rest of the mines in this district, are worked by, Chinese.

The Robinson, Oneida, and Silver Rook claims are on the east slope of the mountain; on the west is the Northern Light, which has been developed a considerable distance and is in a body of ore 12 feet wide, averaging $25 per ton free gold.

The I X L is a vein showing 4½ feet in width; there are two cuts, both in large bodies of ore, assaying $12.50 per ton.

At the west end of the Northern Light is the Lone Star, which has an ore body 12 feet wide; on the north side is the House, on the east side the Grey Eagle and Union, and on the west the Mayflower.

Of the surrounding mines the Boston is said to be the richest. Good float rock has been discovered on Snake River, just above Eagle Rock, which assays $180 in gold. The location is on Fall Creek, which heads near the head of the Caribou Creek; the ledge is about 12 feet wide and crops out in many places. The formation of the country is porphyry and granite.

The increasing demand for salt from the reduction works of Idaho and Montana makes the Oneida salt works of inestimable value. They are located about 60 miles northeast of Soda Springs, near the Old Lander Emigrant road leading from South Pass to Oregon. There are several springs. No pumping is required. The water is run through large galvanized iron pans, in which the salt is crystallized by boiling the water. The water is as cold as ordinary spring water and perfectly clear, showing how completely the saline matter is held in solution. The salt is shoveled out once in thirty minutes, and after draining twenty-five hours is thrown into the drying house there to remain until sacked ready for shipping. The supply of water would warrant 2,500 pounds per day. There is another small spring near by, which yields water enough for 2,000 pounds per day for a portion of the year.

OWYHEE COUNTY.

Caldwell district extends into this county and there are various placer locations worked by individuals.

At the mouth of the Owyhee River a claim has been worked to a small extent.

Mecham's Bar.—A New York company has control of the placer grounds operated last year by Mr. H. S. Cheasbro, and has been arranging during the season for more extensive operations in the future. Some individuals are rocking on this bar, their returns averaging $3.50 to $4.50 per day per man.

Castle Creek district is about 30 miles east of the above. Messrs. *Corning* & Schroeder have operated a placer mine at this point for one

hundred and twenty-seven days during the year with three men. They give their output at $1,462.

Near the mouth of the Brunean River there are also some placer locations, but they have not been worked to any extent, owing to the expense of conducting water upon them. In former years the county was better known as a silver than as a gold producing region, but owing to the refractory character of the ores and the mismanagement and ignorance of the parties operating, large amounts of capital were expended with no appreciable profit, and the whole region acquired a bad name.

Silver City district.—The Black Jack continues to produce good milling ore.

The Empire State mine has a force of men at work. Its vein is decomposed quartz carrying considerable gold.

From the Ruth mine good ore is being extracted, which shows much free gold.

The Belle Peck, immediately east of the last-named ledge, is producing a good quality of ore. The bullion from this quartz is nearly all gold. The ore mills about $75 per ton.

The Kentuck is an extension of the Evening Star. Its rock or quartz is free milling and will yield between $40 and $50.

Rich ore is being extracted from the Dungannon, the South Chariot, and the War Eagle ledges. The latter ore is reported to mill not less than $50 per ton. On the dump of the Red Jacket are about 100 tons of ore, the quantity of which is daily increasing.

The Oro Fino property was purchased by Mr. Timothy Regan. Probably the best hoisting works in the Territory are on this mine; the machinery is all in good condition and ready to start up at any time. The mine has never been prospected and yet a large amount has been taken from it.

The Golden Chariot and Elmore have been prospected to a depth of 1,400 feet, but the Oro Fino has not been prospected deeper than 400 feet. The ledge is large, well defined, and carries pay ore, some of which is very rich.

The Idlewild commenced sinking a shaft in the middle of January, and up to the last of June had milled 45 tons of ore, valued at $2,443. In September the sinking of the shaft was finished and an engine was put in the tunnel 80 feet from the surface. The total amount of bullion produced about 3,350 ounces gold not parted from silver. Value of bullion about $1.70 per ounce. This mine was located in 1865, and is in granite.

The Poorman mine, which in times past was second to none in Idaho, was operated during a part of the year and considerable ore was extracted, which was worked at the War Eagle mill.

The Glenbrook and Clearbrook mines are situated north of the Poorman, and have been worked for several years. The ore is easily mined and mills about $30 per ton.

The Richardson mine, northeast of the Poorman, is on a small ledge, but the ore is exceptionally rich.

The War Eagle mine has been opened to a depth of 600 feet, but owing to the quantity of water in the mine can only be worked on the upper levels. During the last season a fine chute of ore was exposed.

The Stormy Hill is situated south of the War Eagle mine, and is thought to be on the same ledge. A shaft was sunk about 200 feet deep, and drifts were started both ways. The ledge is of good size and uniform richness. About 130 tons of ore were extracted, 90 of which yielded about $40 per ton.

The shipments from this district during the year, as reported by the agent of Wells, Fargo & Co.'s Express, amounted to $10,000 gold and $100,000 in gold and silver bars.

Flint district.—The Twilight mine, in Twilight Gulch, is regarded as one of the best mines in this district.

The Astor is south of the Twilight and produces good ore. It is a contact ledge, between granite and porphyry.

Mammoth district lies 4 miles to the east of Flint district. Its ores resemble those of the latter. They are very refractory and require roasting.

The Mammoth ledge, which is the largest in the county, has been reopened with fair prospects. The ore assays from $10 to $300 per ton and the quantity is large, since the ledge is upwards of 40 feet in width.

The Minnesota, with 2 men employed five hundred and fifty days, produced 1,706 ounces, valued at $6,218.

Wagontown district.—In this district are included the following named mines:

The Stoddard is a ledge about 4 feet in width, which will without assorting average from $20 to $25 per ton. The ore is free milling, worth about $3 per ounce.

The Wilson, northwest of the Stoddard, and supposed to be a continuation of the same, is large, and the ore, which is gold, mills well.

The Ohio lode is about 2 feet wide and the ore is base to such an extent that it cannot be successfully worked without roasting furnaces. Considerable work has been performed in and around it, and it is one of the best properties in the district.

Nothing has been done in Flint or South Mountain districts during the year.

SHOSHONE COUNTY.

The first discovery of gold in Cœur d'Alene in paying quantities was made in the summer of 1880, on Pritchard Creek, near to and east of where the town of Murray is now located.

Pritchard's Creek.—Descending this stream, west of Murray the first claim is the Finnell Fraction, which has two shafts down to bed-rock, about 15 feet in depth and a drain ditch of about 200 feet. The owners are drifting to connect with the shafts, and at every clean-up get coarse gold in paying quantities.

The Wilson & Claggett claim has shallow bed-rock, runs two sluices with a force of 7 men, and its yield is very satisfactory.

Idaho Bar is owned by G. B. Ives and John Silverthorn. It lies in the form of a V on the north side of the creek and contains about 15 acres. The bed rock is shallow. They run three strings of sluices, work 10 men, and average about $7 per day per man.

John McAleer & Co. own a 10-acre claim, the bed-rock of which is from 4 to 6 feet deep; they have two drain ditches, 600 and 800 feet in length, two strings of sluices, and 10 men are employed. The gold is mostly fine.

The Last Chance, owned by Wooten & Co., has about 400 feet of drain ditch and two strings of sluices; yields mostly coarse gold. It has furnished some 10-ounce nuggets: 8 men are employed and average about $8 each per day.

The O K claim has two strings of sluices and works 15 men; about $9,000 have been taken from this claim.

There are several claims near Eagle City, among which are the

ank Grove and the Maguire, on which only development work has far been done.

The Frank Grove drain ditch has been dug the length of the claim turn Pritchard Creek, and averages 10 feet in depth.

The Widows claim lies at the mouth of Gold Run, and the east end Murray, and is being worked very successfully by its owners, and has lded for 2,820 days' work 3,205 ounces, equal to $59,292 About three-irths of an acre has been worked out.

The Webfoot claim, on Dream Gulch, is owed by Oregon parties, who ve taken out about $36,000. The gold is mostly coarse, one nugget ighing 19¾ ounces.

Alder Gulch enters Pritchard Creek from the north at the west end the town of Murray. There are some rich claims on this stream, but e bed-rock is deep, making it very expensive to mine.

Dry Gulch contains one good claim, from which a considerable quan-y of nuggets and coarse gold have been taken.

The Carey claim, in Buckskin Gulch, struck bed-rock that for a dis-nce of 3 feet cleared the surprising result of $112.

There are tributary to Pritchard Creek several other gulches, nong which may be named the Buckskin and Missoula, coming in tween Dream and Alder; Gold Run Gulch, Butte Gulch, and Bear ulch, all of which come in from the north; from the south, Granite reek and Tiger Gulch.

Dr. Campbell has a claim on Eagle Creek, 3½ miles below Eagle City, hich pays about $30 a day per man.

The Heart mining claim is on the main creek. A drain is walled and mbered for a distance of 250 feet, at the end of which a drift extends) feet. Over this drift are 20 feet of gravel, which prospects through-it. Streaks of clay permeate the gravel in many places, and gold is ound deposited in coarse colors. Six men are at work on the claim, nd an open drain has been run 300 feet, and 30 feet drifted in the gravel.

Right Hand Fork.—The northeast fork runs around a butte which losely divides the waters of Alder from those of Gold Run. On No. 1 a reat amount of work has been done. The firm of Campbell, Pease & Co. nd Messrs. Chew, Dugan & Holman are the owners. Three hundred set of a drain have been run and one set of sluices is in operation. Six ien are at work, who take out daily from the bed-rock from 3 to 5 ounces. To. 2 is being worked by John McClair & Co. They are on bed-rock with he drain, and have a long string of sluices running. Six men are work-ng on the bed-rock, and on no one day has their clean-up been less than 7 unces of dust. No. 3 is owned by H. C. Hough, P. B. Hoysington, and R. 'ruett. They are running one string of boxes, and their daily runs are pen to inspection. It is over an ounce per day to the man, and the gold rill average coarser than any yet found in the country. In their last lean-up but few pieces weighed less than 10 cents, while most of them ere nuggets worth from 50 cents to $5. A streak of blue gravel has een struck on this claim which has the appearance of marl and is the ichest pay streak yet found. It lays on the bed-rock, and is 10 inches hick. This streak is composed of tight fine gravel, held in a blue clay natrix, and is particularly adapted to sifting fine gold. It is found to ontain fine particles of the metal, plentifully distributed throughout he gravel. The claims above and below are doubtless on this strike, hich runs on their ground. On the northwest fork a great deal of de-elopment work is going on. The ground here prospects fully as well s the other fork.

The Hydraulic is running again, and the ditch from Alden Creek

completed. It is the longest ditch yet constructed in the country, measuring in its windings 2½ miles. It carries at present 300 miners' inches of water, and is capable of running 500 inches. The Hydraulic now has a 75-foot fall, with a 1½-inch nozzle. Twenty-four men are at work.

The Dempsey Placer has a shaft 10 by 12, and about 13 feet have been sunk in depth.

The Aurora Placer has a drain ditch 400 feet in length and averaging 14 feet in depth.

The Gellet has sluice-boxes set and a drain ditch of 100 feet on the upper end of the claim. On the lower end of the claim a drain ditch between 600 and 700 feet long, with a face of 12 feet, has been dug.

The Wyandott & Peters claim is working 13 men, and a drain-ditch 1,000 feet long by 18 feet deep has been constructed and the bed-rock blasted in to a distance of 7 feet.

Evolution City is situated on the south fork of Cœur d'Alene River, where it is reported rich placer diggings have been discovered.

Gold in quartz.—The mother lode is about 2 miles above Murray Hill, in the bed of Pritchard's Creek. All the quartz in the ledge assays well, even that which shows no trace of free gold assaying as high as $227.38 gold and $32.32 in silver. Loose slate rock is scattered over the ledge, which is from 3 to 7 feet wide. It has been traced a few yards, and apparently plunges into the mountains on either side of the creek.

Hunter district.—The Earle & Potts assays 1,000 ounces in silver per ton; the Hunter lode 400 ounces. The James G. Blaine is a large body of ore assaying $12 per ton in gold, with a small percentage of silver. The Silver Wave shows very rich in silver, with a vein 5½ feet wide.

The Napoleon is on a vein 15 feet wide, and is rich in silver and iron.

The Columbia is 12 feet wide, and is very rich in silver.

The following mines show chloride: The Margaret, Oregonian, Webfoot, Tribune, May, Emily, and Coolidge. The ore from these ledges shows yellow chloride, the lowest figures from half a dozen assays being $51 in silver, while the highest has reached $1,300. The ore is also rich in gold, and being of free-milling character is easily and cheaply worked.

The forks of Eagle Creek are a mass of quartz veins, such as the Mammoth, Silver Belle, Panhandle, Golden Eagle, &c.

Three miles below Eagle City lies the New Comstock, with its extensions.

The new camp of Carbon Center is located at the head of Beaver Creek, 7 miles southeast of Beaver City. It is the center of a flat basin, which is surrounded by high mountains.

The mines about Carbon are distinctively base. They are on the galena belt, which passes the head of Granite Creek and over on to Butte Creek. The ore about Carbon is mainly argentiferous galena of good grade, but red carbonate has also been found. Every variety of galena is represented, and the ore has a general appearance of existing in a good, solid formation. Specimens show black sulphurets, ruby, and galena. The principal locations are the Virginia, Sunset, President, and Rainbow. On the Virginia 15 men are at work. The vein is over 7 feet wide, half of which is solid metal. The Sunset is a strong vein of galena, but the snow on the location has retarded operations.

The President is a 5-foot vein of carbonate and galena, which assays $300 per ton. The Rainbow is mostly carbonate ore of good grade.

On Reeder Gulch, first comes the Homestake, discovered on the 1st of March. It is on the west side of the creek, and crops out on the hillside 15 feet wide for a distance of 50 feet. Only a little surface work has been done, but the ore shows gold.

Following up the creek is the Clagget lode. It is within a few hundred feet of the creek, and runs in a northeasterly direction. The claim is covered by huge bowlders of quartz, which is of itself of great value.

On the Golden Gate, above the Clagget lode, a shaft has been sunk a distance of 30 feet, and the vein holds good for that distance. Average assays returned $30 in gold.

The Poorman and Jenny are parallel veins; the former east of the Clagget and the latter north, and both show the same variety of ore. Assays from these two return an average of $30 in gold. The Kate Burnett is one of the best claims on the creek. The ledge is 7 feet wide.

Northeast of the Kate Burnett is the Henry Clay. The vein is regular and solid.

On the left-hand fork of Reeder Gulch is the Unknown. The ledge is 4 feet in width, and 9 inches of it have an assay value of $150 per ton.

Over the right-hand fork of Reeder Gulch, in the Check claim, there are 3 feet of good milling ore opened up, and in the Idahoan there are several large cuts which intersect the vein in as many places, all showing from 2 to 3 feet of fine ore.

The Paymaster was located last year and has a fine body of ore exposed. The vein is a large one.

On Pritchard Creek and its tributary gulches are quite a number of other valuable ledges, among which may be mentioned the following:

The Fannie, on Trail Creek, shows a 4-foot vein of galena with a 3-inch stratum of gold-bearing quartz on the hanging wall, which is held together by stringers of gold. The Margaret lode, 6 miles above Eagle City, on Eagle Creek, is on a 6-foot fissure vein, and assays $51 gold, $50 silver.

The Grey Eagle mine, 3 miles from Eagle City, on Eagle Creek, shows a 6-foot vein of galena with 55 ounces silver.

The Montana lode, 4 miles from Eagle City, is a 2-foot vein of galena carrying 21 ounces silver.

The Skookum, situated on Pritchard Creek, 2 miles above Eagle City, assays $14 in gold.

The Bullion and Monarch, two 4-feet veins, assay from 40 to 60 ounces silver per ton.

The Lucky Baldwin, located in Dream Gulch, is a 2-foot vein, assaying $25 in gold.

The Sunset group, 6 miles from Eagle City, in Beaver district, comprises eight distinct ledges, containing galena and carbonate ores. Assays average from 40 to 60 ounces silver.

The Jack Wait property, 12 miles from Eagle City, on the east fork of Eagle Creek, is on a 20-foot fissure vein. The ores, which are copper and galena, assay from 40 to 160 ounces silver. The production of the last year, in the absence of any reliable reports, may be safely estimated at $250,000.

WASHINGTON COUNTY.

Mineral district.—The Black Maria is located at Mineral City Camp, 175 miles from Lewiston. The specimens show rich black sulphurets, carrying as high as $450 per ton, some very fine chlorides of silver,

running from $100 to $200, and rock containing a heavy percentage of copper. These samples were taken at various points from the surface to a depth of 115 feet. Present developments consist of shaft, 115 feet deep; two levels, 10 and 12 feet, at a depth of 40 feet from the surface. A cross-cut of 15 feet in one of these levels has not yet reached the foot-wall, but shows a very satisfactory body of high-grade ore, from which the following assays have been made: No. 1 shows 135 ounces in silver and $207 in gold per ton; No. 2, 114 ounces silver, 30 per cent. lead, and a trace of gold; No. 3, 132 ounces silver, 82 per cent. lead, and a trace of gold; No. 4, 440 ounces silver and $211 gold. Most of the ore is free milling, though there is considerable high-grade smelting ore. There are about 300 tons of high-grade ore on the dump, carrying an average of 102 ounces silver, $6 in gold, and about 30 per cent. lead. The camp is easily accessible, on a good natural road from Snake River. The Oregon Short-Line Railway Company have graded to within 15 miles of camp and have their track laid to the Weiser River, 28 miles distant. There are about 40 miners in camp, most of whom own promising locations. Silver and copper ores are abundant in all of these claims. A plentiful supply of wood and water exists in the camp, and every condition is favorable for cheap reduction and marketing of the rich deposits.

Other prominent mines in the camp are the following: The Portage, on which several men are engaged in driving a tunnel, which is in over 100 feet; the Mountain Rose, the Black Hawk, the Daniel Boone, on which a large amount of work has been done in the way of shafts, tunnels, and drifts.

Heath district comprises large quartz ledges, carrying silver chlorides and copper.

The Belmont, the Greenhorn, and the Philadelphia are prominent locations in this district. The first named has been successfully worked for several years. A 5-stamp mill is in operation.

In the *Seven Devils district*, which lies some 75 miles north of Weiser City, discoveries of copper were made during the summer of 1884, and over fifty locations have been recorded. The ledges are of varying widths, running from 2½ to 20 feet.

The ores are exclusively of copper, such as peacock (variegated copper ore), azurite, malachite, and black oxide of copper, assaying as high as 74 per cent. copper. Gold is not always found with these ores. The veins are contact veins, between granite and limestone. The natural facilities for reducing these ores upon the ground are unequaled. The timber is apparently inexhaustible, with plenty of lime and iron, and abundance of water.

The placer mines of Snake River, in this county, are growing in importance every year. There are large tracts of placer ground in the vicinity of Seven Devils mines which are said to pay from $2 to $3 a day per man.

CHAPTER VII.

MONTANA TERRITORY.

The past year has witnessed unusual activity in the mining industries of Montana, and the operations have been generally profitable. The increase in the yield of the precious metals has been large, amounting to at least $1,500,000, about one-third of which was in gold.

The prominent producers of the Territory, such as the Alice, Anaconda, Lexington, Moulton, Hope, the property of the Helena Melting and Refining Company; Boston and Montana, Elkhorn, Drum Lummon, Granite Mountain, Hecla, Colusa, and the Parrott (the last two being principally copper) have continued their yield without abatement, and many new and valuable mines have been opened.

The records of the mints and assay offices show that the deposits during the year of unrefined gold from the mines of Montana were $1,470,253, and the reports of refiners disclose that of the refined gold received at the mints, about $700,000 came from the mines of this Territory, making a total gold production of about $2,170,000. The deposits of unrefined silver were $1,224,375, and the reports of refineries show that of the refined silver received by the mints, about $4,500,000 was obtained from Montana's mines, and Eastern bankers report that about $1,300,000 was exported. These amounts aggregate about $7,000,000. I have, therefore, estimated the production of the precious metals in the Territory for the year 1884 to have been—

Gold	$2,170,000
Silver	7,000,000
Total	9,170,000

which appears to have been obtained from the mines of the various counties as follows:

Counties.	Gold.	Silver.
Beaverhead	$35,000	$700,000
Choteau	5,000	.....
Deer Lodge	465,000	130,000
Gallatin	25,000	5,000
Jefferson	205,000	1,000,000
Lewis and Clarke	610,000	100,000
Madison	293,000	50,000
Meagher	70,000	15,000
Missoula	12,000	.....
Silver Bow	450,000	5,000,000
Total	2,170,000	7,000,000

The following very complete and carefully prepared review of the mineral products of the Territory was prepared by Mr. Russell B. Harrison, assayer in charge of the United States assay office at Helena,

and while his statements, both as to the total production of the Territory and in some cases of the different counties, differ from the foregoing estimate, made after comparison with other data, I have inserted his estimate in full.

The area of this Territory is 145,776 square miles, of which nearly one-third is mountainous, and in this latter area are the gulches and lode claims which have yielded such large amounts of gold. It was in 1862 that the rich gold placers of Montana caused the stampede of miners and adventurers. Since the date of discovery the estimated production of placer gold has been $150,000,000, and the gulches that yielded the larger portion of this amount are still being profitably worked. The yield of the placers during 1884 is estimated to have been about $800,000, and there is no reason for assuming that these deposits are exhausted.

Montana has an area in all parts of which gold has been found, and in almost every county of the Territory placer mining has been prosecuted with more or less activity, while the economical and close-working appliances, the result of experience and invention, are considerably increasing the profit and encouraging the working of less valuable gravel. The lode claims have entered upon a career of prosperity never before known. The attention of capital has been turned toward mining investments, and the result is shown in numbers of new mills and smelters and the development of many small mines to such an extent as to justify the erection of reduction works in the early spring. Two important factors in the increased development of the mining interests of Montana have been the construction of the Northern Pacific and the Utah and Northern Railroads. These and their connections have made it possible to reach quickly and conveniently those districts in which minerals abound, and thus to bring in machinery and transport bullion at such rates as will leave a profit to those engaged in extracting and treating ores and shipping. Notwithstanding the decline in the price of silver and the low price of copper and lead, in the production of which Montana stands in the front rank, the output has been steadily increasing and with but one exception was larger in every district than in 1883.

The mineral wealth of Montana is the principal source of its prosperity, and the extraction and reduction of its ores will long continue to be a leading and productive industry. The copper product of Butte district alone, aside from the precious metals, exceeds that of any other locality in the United States except the Lake Superior region. The following estimates by counties will give some idea of the increased product of Montana during the year 1884, copper, lead, and precious metals being included:

Beaverhead	$1,200,000
Choteau	6,000
Deer Lodge	700,000
Gallatin	40,000
Jefferson	1,600,000
Lewis and Clarke	900,000
Madison	380,000
Meagher	200,000
Missoula	17,000
Silver Bow	11,250,000
Total	16,293,000

Although there has been a slight decrease in the placer yield, the product in gold from quartz mining has more than counterbalanced the loss, and was in 1884 at least twice as great in value, while the total product in gold was in excess of that of 1883 by $370,000.

The deposits and exports of Montana gold during 1884 amounted to the following:

United States assay office, Helena, Mont	$755,219 17
United States assay office, New York, N. Y	656,318 64
United States mint, San Francisco, Cal	82,956 61
United States mint, Philadelphia, Pa	530 40
Shipped to Paris, France	177,694 20
Shipped to London, England	147,790 50
Total	1,820,509 52

Of the total production of $2,170,000 there remains about $350,000, which is accounted for as contained in the large amount of copper matte sent to Europe and to smelting, reduction, and milling works in other States and Territories, gold and silver ores shipped away for treatment, and in packages sent by Chinese to China.

The silver product has increased from $6,000,000 in 1883 to $8,300,000 in 1884, due principally to the enlarged operations about Butte in Silver Bow County, and to the works about Helena, in Lewis and Clarke, and Jefferson Counties. The increase of the silver product in these three counties alone approximated $2,500,000, divided as follows:

Jefferson	$948,000
Lewis and Clarke	208,000
Silver Bow	1,293,000
Total	2,449,000

This increase, although showing Silver Bow County to contain the principal mining districts, tells its own story of the increasing value of the mines in other districts and of the developments being so energetically pushed. A small increase can be shown in all the counties but one, and that will probably next year resume its former rank in amount of production. Deer Lodge County has produced less in silver than in 1883, owing to the fact that one of its largest producing mines has been shut down during the erection of large works and another, to its great disadvantage, compelled to remain idle through litigation. Quartz mining has made great progress during the year, as is evidenced by the large expenditures made in exploring and developing promising properties and in the satisfactory returns made by many of them.

Following is a list of the incorporated dividend-paying mines of Montana during 1884:

Mines.	Date of last dividend.	Rate per share.	Amount.	Total to date.
Alice	Dec. 1, 1884	$0 12½	$50,000	$550,000
Boston and Montana				310,000
Elkhorn	Monthly		5,000	30,000
Hecla	Nov. 1, 1884	5	15,000	717,500
Helena M. & R. Co	Dec. 5, 1884		36,000	(*)
Hope	Oct. 1, 1884	1 50	12,000	158,281
Lexington	June 23, 1884	4 62½	185,000	565,000
Moulton	Dec. 4, 1884	7½	30,000	80,000
Original	Oct. 4, 1884	5	3,000	114,000

* Same amount declared for January 20, 1885.

Besides these there are a number of mines, including some of the most valuable in the Territory, owned by private parties which are known to have yielded large profits. The United States assay office at Helena

received the following amounts of gold and silver from the various c ties and from the Territory of Idaho:

GOLD.

Localities.	Ounces.	V
Beaverhead County	1,110.22	21
Choteau County	223.98	3
Deer Lodge County	7,183.66	12
Gallatin County	775.88	1
Jefferson County	3,871.24	7
Lewis and Clarke County	22,493.26	24
Madison County	13,135.74	21
Meagher County	3,117.99	5
Missoula County	51.75	
Silver Bow County	196.26	
Yellow Stone County	14.89	
Idaho Territory	7,278.17	12
Total	59,455.04	88

SILVER.

Jefferson County	850.70
Lewis and Clarke County	406.61
Madison County	214.05
Missoula County	234.56
Silver Bow County	1,015.88
Jewelry	47.82
Total	2,769.92

I estimate the output of precious metals for 1884 to have bee gold, $2,170,150; in silver, $8,138,350; total, $10,308,500, divide follows:

County.	Gold.	Silver.	T
Beaverhead	$35,000	$740,000	$
Choteau	5,000	1,000	
Deer Lodge	465,000	160,000	
Gallatin	25,000	10,000	
Jefferson	205,000	1,048,000	1,
Lewis and Clarke	610,000	258,000	
Madison	293,000	65,000	
Meagher	70,000	57,500	
Missoula	12,000	5,000	
Silver Bow	450,150	5,793,850	6,
Total	2,170,150	8,138,350	10,

BEAVERHEAD COUNTY.

Mining operations in this county have, until recently, been cl identified with the enterprises and management of the Hecla Co dated Mining Company and their various rich mines and extensi duction works at Glendale, Greenwood, Norwood, and Hecla, but d the season of 1884 a large number of rich locations have been ma other parts of the county. This is especially true of *Birch Creek, Arg* and *Blue Wing districts*, in which development of old and new loca has been attended with most satisfactory results.

Bryant district includes Lion Mountain, on which are located a ber of the most important mines operated by the Hecla Com These mines consist of an extensive group of lodes that are well op

and supplied with modern machinery adapted to working them cheaply and expeditiously. The principal ones are the Cleopatra, Alta, Oneida, Clara, Silver Quartz, True Fissure, Atlantis, Nos. 1, 2, and 3, and Mountain Sheep. Among the twenty silver mines of this company probably the best known is the Cleopatra of the True Fissure group. It has an unusual history. Down to the 300-foot level it was regarded as a low-grade mine, but from that point down to the 600-foot level it doubled in value, and from the 600-foot level it again improved in about the same rate in quality, while the ore bodies became larger and stronger. About 150 men are employed in the mine sinking and drifting in five different directions. The incline is now 1,200 feet deep and sinking at the rate of 4 feet per day.

The True Fissure mine has produced about 25,000 tons of ore, and was at one time considered the great mine of the company, but it has been broken up by a "mud zone" below the 600-foot level, and has produced very little first-class ore of late.

In the Mountain Sheep the main incline is down about 1,500 feet, and at a depth of 1,100 feet it cut through the "mud zone" and resumed its former character. It is expected that the True Fissure will at that depth also do the same.

The best grade of ore of the Fissure group was found in the Silver Quartz, but at the depth of 250 feet the lode ran into a cap, and when it was cut through what seemed to be an entirely different vein was found, carrying low ore, and of a kind not found elsewhere on the mountain.

The Trapper mine is the one that first obtained prominence in this district. In July last development disclosed an immense body of very rich ore in this mine, and it is believed to be one of the best properties owned by the Hecla Company.

The Hecla, Franklin, Cleve, Mark Antony, Ariadne, Mamie, Snyder, and John Thomas are all promising locations, and have in sight enough first-class ore to assure the company's future.

The Hecla Company has its reduction work located at Glendale, 9 miles from its mines, on Lion Mountain. During the past year the management has added a third water-jacket furnace to the two previously in use, and with this increased capacity the furnaces are able to turn out every twenty-four hours at least three hundred bars of bullion, or 14 tons. Besides its plant at Glendale the company in 1883 erected an immense concentrator at Greenwood with a capacity of 200 tons. This company has for the past four years, without interruption, declared regular monthly dividends of 50 cents per share on 30,000 shares, or 1 per cent. on its capital of $1,500,000. With occasional special dividends of like amount, the total dividends up to January 1 last aggregated $732,500. The total production of the Hecla Company for 1884 amounted to 248.264 ounces of gold of the value of $3,131.62 and 656,849.02 ounces of silver of the value of $689,691.47, besides 4,589,280 pounds of lead and 339,925 pounds of copper.

The *Blue Wing district* is the most extensive district in the southern part of the Territory, and is situated some 10 or 12 miles from Dillon. Until the summer of 1884 the mines in this district had been worked by the slow and unprofitable way of hand windlasses, when the first move towards revolutionizing this crude method was adopted and several steam hoisting works put in place.

The New Departure, owned by Judge Lawrence A. Brown, is the principal mine in this district, and the best opened and most thoroughly developed. Upon this property steam hoisting machinery has been recently applied. The mine has been worked for a number of years,

and during that time it has produced a large amount of first-class shipping ore. During the past season it has been steady and large producer. Recently a bonanza shoot of high-grade ore has been developed that will take about two years to exhaust with the force at present employed. The character of the ore is black, with an abundance of heavy galena, something not met with in the old workings of the mine. A recent shipment of ore to Omaha netted $189 per ton profit.

Among other mining properties in this district are the Ruby and Bonaparte mines. The attention of the owners has been chiefly directed toward the development of the lodes, both of which are supplied with steam hoisting and pumping machinery. The high-grade silver ore is shipped in sacks to reduction works in the East for treatment.

The Charter Oak, El Dorado, Del Monte, and Huron are other properties, the owners of which, from the good results already obtained, will the coming year substitute steam hoisting works for the hand and horse windlasses, and otherwise develop these mines, rich in the character of ore they contain, a high-grade silver.

On the El Dorado mine, where the tunnel tapped a 40-inch vein of 93-ounce ore, a station has been cut and a shaft dropped on the vein. Levels have been advanced both ways in order to open up the ore-body and put the mine in shape for stoping.

In the *Birch Creek district* the energetic development of new and old properties has been attended with most gratifying results. Among them may be mentioned the Eureka, Lone Star, Mountain Queen, Alaska, and Red Bear mines, all containing veins of high-grade ore.

On the Alaska a tunnel has been run 400 feet in length, which tapped a vein of rich carbonate ore at 200 feet below the surface. The formation is limestone, the tunnel following the contact between the hard, flinty lime on one side and the soft, dolomite lime on the other, rendering the work easy, rapid, and comparatively inexpensive.

The Mountain Queen has opened into a fine body of very rich ore which promises the most flattering results to its owners.

On the Red Bear, a vein 3 feet thick of rich, red ore has been encountered, and a shaft dropped on the vein to the depth of 30 feet.

The Greenwich copper mine has been developed by a 60-foot shaft, at the bottom of which was found an ore vein of 4 feet, which assayed 20 per cent. copper and averages 20 ounces of silver to the ton. Other promising openings along the course of the lead give assays high in gold and silver.

Two miles southwesterly from the Greenwich mine are located the iron and copper mines ownedby the Shelby Mining Company. The ore product of these mines is a natural flux, being 60 to 70 per cent. pure magnetic iron, and carrying only 3 per cent. silica and 5 per cent. of lime. The deposit is immense, and 500 tons per day can easily be produced with present facilities should a market develop itself for such quantities. It also carries $4 to $8 per ton in gold and 6 to 8 per cent. in copper, which is shown in the bullion product wherever this ore is used for fluxing purposes. The ores produced by these mines supply a want generally felt in this part of the Territory, where suitable fluxing ore for the reduction of refractory lead, silver, and copper ores has been needed in large quantities. The company is now taking out 50 tons of ore daily, all of which is being shipped to the Butte and Glendale smelters.

For a distance of 8 miles along Birch Creek prospecting is being actively prosecuted. Considerable work has been done by the Birch Creek Prospecting Company at the head of Armstrong Gulch, 4 miles

the iron mines. On Sheep Gulch, a tributary of Birch Creek, ɜ. Power, Green & Co. have started a bed-rock flume for working ıcers.

he mines of *Argenta district* the work has been very satisfactory, e product during the past season has been largely in excess of ɜld for 1883.

he Legal Tender mine the ore raised is similar in quality to that ted in the past which, it was found profitable to mine, sack, and efore the railroad penetrated the Territory. Recently in running from the 125-foot level in the whim shaft, a fine vein of rich sil- ıd ore was struck, assaying from $300 to $400 per ton.

iscovery made the past summer, near Big Hold River, about 4 from Melrose, has attracted much attention to a district at present ınized. The lead discovered has been named the "Berlin," and car- ɜceedingly rich quartz. A double compartment shaft has already ɜd the depth of 85 feet, and a large force of men are employed ıg and stoping. At a depth of 55 feet the shaft cut through the n which was found 4 feet of high-grade ore and 10 feet of vein ɜ. The vein dips at about an angle of 75°. The ledge matter out will go $30 per ton in gold. Numerous other locations have nade in the immediate vicinity of the Berlin. The yield from workings in this county, though greatly reduced in amount the pioneer days when the Bannack district yielded its rich s of gold, has increased rather than diminished as compared with eceding year. In all the districts above referred to are found ex- ɜ placer workings, which, during the past year, have been operated ıtisfactory results. In addition to these, the new fields discovered Birch Creek and in Sheep Gulch, besides renewed operations on g gold mining properties in the Bannack-Marysville district, long ıded under the management of California capitalists, have all con- ɜd to the increase of the gold production.

production of this county for the year 1884 is estimated to have 35,000 in gold and $740,000 in silver; in all, $775,000.

CHOTEAU COUNTY.

ɜe Rockies.—The Bear Paw and Little Rocky Mountains (practically ne range) and Sweet Grass Hills, about 160 miles east of Fort ı in the Blackfoot Indian Reservation, have been known for years ineral-bearing country, but up to the spring of 1878 it was con- l too unsafe for prospecting. In 1865 Chris. Keys and a party he had organized were killed while on their return to their ery. Search has been repeatedly made for his old stamping l, but without success until the fall of 1884, when the present ctors found a pit 100 by 150 feet, which is supposed to have been l by him at the head of Little Alder Gulch. Even so late as Sep- ɜ, 1877, an attempt was made by a man named Steel and a partner ıpect the Little Rockies, and they were killed by the Indians on Creek.

Nez Percés raid of that year brought many old prospectors into ountains, and what they there saw induced the fitting out of a of prospectors in the spring of 1878. This party, after examin- number of the creeks running out of the Bear Paw Mountain, up, some of them returning home, and others remaining to ɔct further on. While this party were prosecuting their search

another party of four men were prospecting on the head of Snake Creek. In July a new outfit was given them, a part of which consisted of sluice lumber. Fair prospects could be found the whole length of Snake Creek, and the owners of the claims divided into two companies, and started drain ditches.

While these operations were going on, *Eagle Butte district* was organized on a tributary of People's Creek. An attempt was made to reach bed-rock by means of a drain ditch, but being retarded by quicksand the effort was interrupted by a regiment of United States Infantry, and the prospectors were incontinently hustled off the reservation after a stay of about three weeks. About the 1st of September, 1884, rumors reached Fort Benton that two prospectors had, about June 15, made discoveries of rich placer mines in the Little Rocky Mountains, lying between the Milk and Missouri Rivers, about 25 miles north from Rocky Point, on the Missouri, at the head of Warm Springs Creek, and immediately a stampede was made for that section. The situation is similar to the Black Hills, the spur of the mountains tipping a little to the west. The gulch is 5 miles long, and soon it was all staked off in claims of 300 feet from rim to rim by the prospectors, who came from all directions. The discoverers had cross-cut the gulch and found two channels where they obtained good prospects. On bed-rock they got as high as $3.50 to the pan and averaged at least 25 cents. Five feet of solid gravel was found in the channel that averaged 12 cents to the pan. This was called Little Alder Gulch, and was at the head of Warm Springs Creek. Two companies did well there sluicing during the fall, taking out from $15 to $25 per day to the man. The miners had a good fall and work was continued up to the 20th of December, when the cold weather stopped all work throughout the diggings. The gulches tributary to the Discovery Gulch have yielded good prospects, and there are several bar claims, but the amount of water available is small, although water can easily be brought in. In Discovery Gulch they had about 50 inches of water, but in the spring the volume reaches 500 inches. On this account very little prospecting has been done in the deep diggings. The shallow diggings in Little Alder Gulch, where most of the work was done, have paid well, but the process of taking out the gold last fall was slow, on account of the scarcity of water. The formation of the country and of the gulches is different from anything yet seen in Montana, being a conglomerated mass of broken limestone, porphyry, and slate, with no wash-gravel. The gold appears to be in a kind of cement, and the gravel of broken stones seems to be coated with it. The country contains farming and grazing land.

Little Rocky Gulch was struck on Rocky Creek 4 or 5 miles west of Little Alder Gulch. It is about 5 miles in extent and has been staked to the prairie. From No. 5, below the discovery, to the head of the gulch, the diggings vary from 1 to 5 feet in depth, while below No. 3 they grow deeper. But here, as in Little Alder Gulch, it is believed the deep diggings will prove the richest. Good prospects were found on People's Creek, across the low divide, and there was a stampede in that direction of men who had come in too late to get claims in the other gulches.

Big Horn Gulch is located on People's Creek, which is the only creek running north into the Milk River, on which color has been found. This gulch is a small one, but the property is exceedingly rich. During the fall there were about 400 men in the camp prospecting, of whom about 100 are wintering in the mountains.

The output of the Little Rocky placer mines during the past season is estimated as follows:

Little Alder Gulch	$3,000
Little Rocky Gulch	2,500
Big Horn Gulch	500
Total	6,000

Of this amount the United States assay office at Helena has received $3,989.67. The average fineness of the dust in gold is .857, and silver .134.

The Sweet Grass Hills, in the same neighborhood, have been prospected during the past summer and enough is known to convince those who have been there that it will pay to prospect further. Some rich specimens of quartz have been found. The same may be said of the Bear Paw Mountains. The Bear Paw and Little Rocky Mountains follow the general directions of the Missouri River and are nowhere more than 20 miles from it, thus affording cheap transportation for ores, bullion, machinery and camp supplies.

DEER LODGE COUNTY.

The production of gold and silver in this county during 1884 was less than in 1883, which is accounted for by the fact that two of the largest producers of silver have made in one case no output at all, and in the other but a small showing as compared with that of last year. The Granite Mountain was operated most of the year, but the ores lay untouched on the dumps until December, when the new mill of that company commenced operations, making a short run of twenty days, which yielded $60,000. The decrease in silver is considerable, but the yield in gold was in excess of 1883 and almost sufficient to keep the total production at last year's figures. The gold production was from two principal sources, the placers and the Cable mine, the output of the latter being in excess of last year and not less than $450,000.

The placer yield for 1883 was $190,000. For 1884 it was as follows:

Pioneer	$75,000
Bear and Elk Gulches and vicinity	45,000
Other gulches	70,000
Total	190,000

The operations at Philipsburg in the *Flint Creek Mining district* have been of a character to insure confidence in their permanency, and to act as an incentive to greater development in the future.

The San Francisco Consolidated Company are the owners of two lode claims in this district, known as the E. D. Holland and Little Tom. The vein cuts the lime and granite contact about a mile northeast of Philipsburg and near the old and dilapidated mill of the North West Company. The Little Tom was discovered in 1883. In prospecting above the E. D. Holland they found pay rock in an old location abandoned by the Hope Mining Company, and a little work developed the fact that this was an extension of the Holland, and very rich. Explorations were begun by running a tunnel into it from the bottom of the hill. The vein has a northeast and southwest strike, and dips to the south about 70°. The tunnel, over 500 feet long, starts nearly at the point of contact, and runs directly in on the vein and has not been out of it. The timbering is 5 by 6 in the clear. For the first 200 feet the

quartz was of low grade, but since the header left the 400-foot station the ore has been abundant and of high grade. The ore is similar to the famous granite quartz, showing ruby and native silver, and assays as high as 250 ounces to the ton. Most of the rock is good pay and the vein is gradually enlarging as the adit advances.

Work on the Alice-Norah has progressed steadily, and shown a great improvement as the header has been advanced. This mine has been under bond and is regarded as most promising.

At Winger No. 2 McDonald & Co. have struck high-grade rock in the 50 foot cross-cut, showing a wide ledge of ore running from 50 to 100 ounces per ton in silver. The lack of reduction facilities has been a great drawback to development.

The Granite Mountain is justly entitled to the distinction of being one of the richest silver mines in the Territory. Developments have been energetically pushed on it, and a 20-stamp mill erected. Operations were principally conducted in three tunnels, the lower one being 1,200 feet in the hill and its face 400 feet from the surface. The first-class ore in No. 3 is followed for several hundred feet without a break, and varies from 4 to 5 feet in width. Development has also been pushed in the upper tunnels, and a large amount of ore accumulated on the dumps and in the ore houses awaiting completion of the new mill for reduction. During the early part of the year work was delayed by a considerable amount of retimbering. The output has been small, but it is owing to the fact that none of their ore was sent to custom mills as formerly, and their new mill was not contracted for until the summer was well advanced. The new mill was completed and started on its first run December 10. From that date to December 31 the bullion product was $60,000. The ore at the present time is pulping about $130 per ton. The mill has 20 stamps, 1 drying furnace, 1 chloridizer, 6 pans, 3 settlers, and 2 amalgamating pans, and is capable of saving a high percentage of the precious metals. A Corliss engine furnishes the power. Since the 1st day of June, 1884, $150,000 has been spent by this company in improvements, including the grade to the property, which cost $12,000. Money enough has been realized from the mine to pay its original cost and the cost of all improvements, the company thereby carrying no indebtedness and having a bright prospect ahead.

The Hope, after a thorough overhauling and repair of its mill, started up on the 28th of May with large reserves of ore in sight, and on the same day in the east workings a rich ore-body was opened, showing a width of 5 feet and assaying 35 ounces. This mine is owned by the Hope Mining Company, of Saint Louis, Mo., composed of nearly the same stockholders as the Granite Mountain Mining Company, who are also owners of the Emma and several other patented leads. The Hope Company have confined most of their operations to the Hope and Emma mines, which have enabled them to pay dividends almost from the start. Dividends for the year amount to $36,000, and to date a total of $158,251. The company's 10-stamp mill has been supplied mostly during the year with Hope ore. The mill has new batteries and tanks, and the refitting of the machinery has made it as good as new. The product for the year was about $100,000.

Early in 1883 the Cable mine was thoroughly timbered, and has been since continuously worked, supplying its 30-stamp mill with all the ore it could crush. On the 300-foot level drifts were extended, opening up ore supplies, which will require a long time to mill, and at the same time development has been continuously progressing at other points, which show large reserves of ore. From this lead it is not unusual to take

large lumps or rock carrying free gold to such an extent as practically to be nuggets. This was especially the case in 1883, and only recently a specimen weighing 21 pounds was taken out so rich in gold as to be worth about $4,000. The specimen was larger than one's two fists, and was studded with lumps of gold from the size of a hazel nut down, and the spaces between them completely covered with flakes of the precious metal. It was sent to the New Orleans Exposition and placed among the large exhibit of Montana ores. The product of this mine was less than last year, or about $250,000.

The Pyrannees mine and mill have been steadily operated, and at a profit. This property was for awhile under bond, but the sale not was consummated. Development has been satisfactorily progressing, and the property has produced some $25,000, about the same as last year.

The development of the Princeton has been so satisfactory as to justify the company in erecting works. The 2-compartment shaft is 156 feet down. The ledge was cross-cut at the bottom, and a drift pushed west from the station on the ledge, from which good ore was taken. A No. 7 Knowles pump and a No. 5 sinking pump are used in the mine, which will be sufficient to keep the water under control for several hundred feet below the present station. The company enlarged their building sufficiently to admit of another boiler, which is now in working order, and a new mill erected.

The Algonquin mill was not operated during the year, even on custom ore as formerly.

The Speckled Trout is in nearly the same condition as the Algonquin, not having been operated for some time on account of the low-grade character of its ores.

A rich strike was made in October, a few miles from Philipsburg, near Medhurst. From the Eureka mine, situated near the head of Princeton Gulch, it was found that 18 inches of the 3-foot vein assayed as high as 400 ounces silver and $60 gold, the other foot and a half averaging about 100 ounces in silver. The shaft is down about 50 feet, from the bottom of which the ore was taken that produced the above assays.

During the latter part of the year a new district, known as the *Oro Fino* was opened a few miles southeast of Deer Lodge, in which it is believed there are numerous good quartz leads.

A shaft has been sunk on the Champion, and rock taken from the bottom of the shaft ran over 300 ounces per ton. The vein matter where this was taken out is 12 feet wide. The Champion is only one of several leads on which shafts have been sunk which have showed up well.

The *Nevada Creek district* has been developed to an extent that has opened up a promising prospect. The Clara Mining Company are down 150 feet upon the Last Chance, and have about 125 tons of ore on the dump, running from $50 to $100 per ton in gold. This company have opened up their mines sufficiently to determine upon the erection of a 10-stamp mill. Last Chance No. 2, Last Chance No. 3, and Last Chance No. 4 are all promising prospects.

The Ogden, in close proximity to the above, is regarded as a valuable property.

At the McClellan lode, near the head of McClellan Gulch, the 10-stamp mill has been in operation during a portion of the past summer, the product amounting to about $3,000.

The Golden Chariot is about half a mile distant, and was discovered about a year since. The ore shows coarse free gold, and promises to be

a valuable lead. On this same belt are several valuable leads owned and developed by Jeff. Harrington, who has about 1,000 tons of ore on the dump which will mill $25 in gold.

Below Harrington, Mr. Isbell has also a valuable mine, the ore being free gold quartz and assaying from $25 to $300 per ton. There are about 150 tons on the dump. The ores of the mines in this district are rich in free gold, and are free milling.

The production for this county was as follows:

Gold:		
Placer	$190,000	
Quartz mines	275,000	
		$465,000
Silver:		
Granite Mountain	60,000	
Hope Company	97,000	
Wiggins & Co	3,000	
		160,000
		625,000

GALLATIN COUNTY.

Mining in *Emigrant Gulch* continues as for many years past with even better results. The gold gravels are deep, unlike most placer locations in the Territory, and apparently very extensive. Placer ground was discovered on a branch of the East Fork of Emigrant Gulch Creek. Several claims have been staked out, and on one of them a considerable force of men have been at work, opening the ground with good prospects.

The Cone Placer Mining Company was organized during the past summer at Minneapolis with a capital stock of $200,000, for the purpose of carrying on operations in Emigrant Gulch, 4 miles from the Park Branch of the Northern Pacific Railroad.

The Little Mack, Anna Jane, and Tiger claims in this district were sold in the summer to Crawford Livingston, of Saint Paul, for $15,000; they are in the *Upper Emigrant district*, about 7 miles from Chico, and all on the same lode, as is also the Gold Leaf, owned by A. M. Holter, of Helena. The ore is rich, free-milling, gold-bearing quartz. Quartz mining in this gulch is improving and many apparently rich discoveries have been made. One lead in particular has attracted much attention, discovered and owned by Mr. William Gray and called the Buena Vista. The vein has been traced for nearly 2 miles, and the ledge is about 4 feet thick; the ore shows free gold, and is a rotten quartz, very easy to work. This lode is in a spur of Emigrant Peak, of the Snowy range, at the head of Emigrant Gulch, some 3,000 feet above the valley, and is 5 miles from the Yellowstone Park Branch Railroad. Further prospecting in the neighborhood of this lode resulted in the discovery of some placer claims which gave satisfactory results.

During the past year discoveries in Cook City and Clark's Fork mines have occasioned great interest among mining men. Cook City is situated on Soda Butte Creek, a tributary of and about 2 miles from the Gallatin River, and about 90 miles from Cinnabar, the terminus of the Yellowstone Branch of the Northern Pacific Railroad. The surrounding country is rough in the extreme, great jagged mountains and deep ravines predominating. The country is well timbered and has an abundance of water, fire-clay and hematite iron ore, a ledge of this material having been discovered and located by Mr. James Howell, which carries 64 per cent. of iron.

Previous to the treaty of 1882 the Cook City mining country was only known to trespassers on the Crow Indian Reservation. Since the treaty hundreds of men have penetrated into these mountain fastnesses and opened up a rich and fertile field.

The Great Republic was opened first by Eaton & Co. in 1882, when they began taking out ore. Last winter work was begun in earnest and a shaft sunk 200 feet deep through bodies of broken ore. Going higher up the mountain another shaft was started on the contact between the limestone and slate, and sunk 60 feet, working down on a vein of good ore. From the 60-foot level drifting began, and up to this date nearly 1,000 tons of ore have been extracted which assays high in silver. At the Iron Clad, or second extension of the Republic, which has been worked at intervals since 1870, work was resumed in November on a tunnel running on the main vein, and about 50 tons of high grade smelting ore has been taken out. This ledge follows the mountain, which is in the shape of a horse-shoe.

The mines adjoining the Republic on the east are the Whitefoot, the Battle Axe, and the Orient. These mines show the same class of ore as the Republic, but of a higher grade. On the Battle Axe the shaft is down 30 feet in a 5-foot vein of heavy manganese, carrying silver and gold.

In the Eclipse mine, next to the Orient, the ore changes materially, the vein being from 3 to 5 feet in width, carrying silver and lead, but in many places has only 2 feet of vein matter, with from 12 to 18 inches of copper glance, assaying high in silver. Miller Mountain is situated 1½ miles northwest of Cook City. Much work has been done there, notably on the Shoo Fly and Bunker Hill. A shaft 70 feet deep has been sunk on Bunker Hill, from which three cross-cuts have been run and ore encountered in each cut. The lower cross-cut opens up ore more valuable and on a wider vein than that in the upper cut. The ore is base and carries silver, lead, and copper.

The Morning Star lode, a mile northwest, has a shaft 50 feet in depth on galena and carbonate ore, 40 tons of which lay on the dump. The vein is rich, the average assay showing 150 ounces of silver. A tunnel 250 feet in length will tap the ledge at a depth of 250 feet. The tunnel has already cut a blind lead 12 feet in width, the ore of which assays 90 ounces.

The Rising Sun mine, owned by the Eastern Montana Mining and Milling Company, is a promising piece of property, having a 4-foot vein of base ore carrying gold and silver. A tunnel was run 210 feet, and at 90 feet encountered the main ore-body. The mine is idle. About forty locations have been made on the Miller Mountain, and well-defined walls found on every lead.

The Black Warrior is situated between Henderson and Miller Mountains, near War Crown Butte, and has a shaft 120 feet deep, from which 100 tons of base gold and silver ore have been taken out, averaging 75 ounces of silver per ton.

The Homestake has a tunnel 60 feet in a well-defined ledge with only one wall yet discovered. The lode has been tapped at a depth of 50 feet from the surface. The average assay is about 200 ounces silver, and 15 per cent. copper, as shown by the Anaconda Company's assay.

In the Little Daisy, an extension of the Homestake, a rich strike was reported in August last. The ore is a rich argentiferous galena, combined with black sulphuret, and appears to be interlaced with threads of pure gold, plainly visible to the eye. This mine is developed by a

tunnel 200 feet in length, and is opened across the lode a distance of 12 feet, showing gray copper with fine gold and galena. A sample of this ore, assayed at the United States assay office at Helena, was reported galena and free gold; gold to the ton, $7,710.73; silver, $98.58.

The Young America has been worked by a tunnel during the past winter, and is opened up in good shape. The entire vein, 10 or 12 feet in width, carries the same character of ore as the Homestake and Daisy.

The Aurora mine is developed by a tunnel 110 feet in length. The ledge is 32 feet in width, the ore sampling, on an average, $94.50 per ton. The mines mentioned are all embraced in an area of 10 miles.

The Sheep Mountain, near Henderson and Miller Mountains, has also been well prospected by tunnel and shaft. The Silver King, Orange Blossom, Warrior Chief, Saturn, Little Ned, and White Warrior seem to be valuable properties, as they are easily worked, the ore being high grade.

A smelter, owned by Eaton & Co., was erected in 1883, with a capacity of 40 tons per day, and after a trial run was made, which was satisfactory as to the working of the ore, remained idle, as the expense of transporting the base bullion to the railroad and thence to a market was too great to permit of a profit. The Wells Mining Company's smelter, with a capacity of 20 tons, which produced the first bullion sent out of this district, has also been idle during the year. The ground for a railroad to connect with the Northern Pacific at Cinnabar has been surveyed, and preparations made for its completion during the coming season, which will do much toward the development of this region. Machinery is transported to the mines by teams at great expense; in fact the roads in this mountain country are only open for a short time in the summer, and in the winter months the journey must be made on snow-shoes. It is only in the mid-summer months that the mines can be worked. Unless the railroad is constructed it will be necessary to erect a refinery to overcome the difficulty.

Bear Gulch is a comparatively new and undeveloped district on Bear Creek, which flows into the Yellowstone River 3 miles above Gardiner, some 6 miles above the terminus of the Yellowstone Park Branch Railroad, and close to the limits of the Yellowstone National Park. The mines are exceedingly difficult of access, and the country around is wild and mountainous, but very rich in placer mines and free-milling gold-bearing lodes. Most of the property is owned by Maj. George O. Eaton. At the mouth of the gulch he is working a force of men successfully with canvas hose, and further up he is working for bed rock. The gold from these placers is worth $19 per ounce, and during the summer he has taken out about $1,000. The quartz taken from the mines shows free gold in large quantities, and 30 tons, run through an arrastra during the summer, yielded 1 ounce of gold to the ton.

Major Eaton has now at Cinnabar, 6 miles from the gulch, a Pomeroy pulverizer and complete improved machinery for working this ore, which, as soon as the weather permits, will be transported by teams to the mines.

Crevice Gulch, in Crevice Mountain, 4 miles above Bear Gulch, has been but little developed this year. The operations have been very crude and limited, principally owing to want of proper machinery. The quartz, as in Bear Gulch, shows free gold. In the summit lode 100 feet has been added to the depth of the shaft, making it 210 feet deep, showing the 10-foot ledge of pay ore as before.

The Granite is also a good location near the summit, and the shaft

has been extended some 50 feet deeper. The placers in this gulch also promise well. John Knowles has been at work on a claim near the mouth of the gulch with two men, and has taken out about $1,200 in shot gold. But little work has been done on these placers, and they are comparatively undeveloped. The amount of gold credited to Gallatin County, deposited at the Helena assay office in 1884, is about $12,500, of which one-half was dust. Undoubtedly the larger portion of the production of this county has been shipped elsewhere in the shape of select ore, and the total amount produced in the county for the year is estimated at $25,000 in gold and $10,000 in silver.

JEFFERSON COUNTY.

A review of the producing condition of the mines and reduction works in the different districts of Jefferson County exhibits a progress more satisfactory than at any period of its history. Prior to the advent of the Northern Pacific Railroad and the Helena and Wickes Railroad, running from the main line some 20 miles into the heart of the mountains and the extensive mineral fields of this county, few of the lead-silver mines there could be worked to advantage, chiefly from the low-grade character of their ores. Mines that would not pay expenses before the branch railroad was constructed have since developed into valuable properties. Salt, used in the reduction of milling ores, that two years ago cost $85 now costs only $25 per ton. The same percentage in saving has appeared in mining supplies and the necessaries of life. Several new districts have been opened up during the past year which augmented the increased mineral production of the county.

The Helena Mining and Reduction Company acquired by purchase somewhat over a year ago the property of the late Alta Montana Company. The following items are mainly from the annual report: The works and most of the mines owned by the company are situated at Wickes, which has recently been connected by rail with the city of Helena and the Northern Pacific Railroad. The new company have built the entire works and added largely to their capacity, at an expense of $190,667; have increased the daily capacity of the 6 calciners from 25 tons to 8 calciners with 60 tons capacity and the two smelters from 40 tons capacity to 80 tons; rebuilt the 15-stamp mill and increased it to 25 stamps, and added two new boilers, rebuilt the Comet concentrator and increased it from 35 tons to 120 tons capacity; built the Alta concentrator, 150 tons capacity, giving a daily concentrating capacity of 270 tons; built 6 charcoal kilns of 25,000 bushels per month capacity; built $5,000 worth of track in and about the works, and have nearly completed 2 miles of wire tramway, and increased the water supply by laying pipe and adding pumps and tanks. The various additions and improvements have not only increased the size and capacity of the works, but resulted in reducing the cost per ton of treating the ore, from 30 to 50 per cent. They have produced 2,015 tons of bullion, 15 tons of mill retort, 300 tons of matte, and shipped 1,453 tons of concentrates (balance, over 9,000 tons, was smelted), making a total gross value of $941,033. They have taken out of the Comet mine 21,000 tons and out of the Alta 13,000 tons, making 34,000 tons. The bottom of the 220-foot level of the Comet mine, after losing the vein for a short distance, has opened into one of the largest ore bodies in the mine, and the face of the tunnels and levels are in large bodies of ore. The faces of some eight or ten of the levels and tunnels in the Alta mine are in

good ore. The bodies of ore reserves now in the mine measure 65,000 tons as against 24,000 tons when they commenced work. At the Alta one-half of the entire force of men is employed in the work of development and one-fourth in the Comet mine. In the time named (a little over a year) a net profit of $343,448 has been made over and above expenses. This net profit, or the greater portion, has been used as follows:

Permanent improvements	$190,667
Wood, coke, and supplies on hand	63,277
Tools and implements	5,971
Development, North Pacific, Custer, and others	21,000
	280,915
Balance, cash on hand	62,533
As above	343,448

Of the $344,000 profit, $269,560 was made since May 1 (six months before which date the reduction works could not be put in tolerable working order), an average net profit of $45,000 per month.

In the report referred to the president says: "The fact that under these disadvantages we have averaged for the past six months $45,000 per month net, and that within two weeks our Huson tramway from the Comet mine, 2 miles over the hill towards the works, will be finished and save $3,000 per month, and that our charcoal kilns, now finished, will save us $1,000 per month net, I feel safe in estimating that we will clear from $45,000 to $55,000 per month. With the bullion cashed we have on hand $63,000, and will have December 1 $110,000."

In the Alta levels aggregating 2,171 feet have recently been run. The North Pacific has been idle for years, but is now in course of being cleared out by means of a shaft and pumping works. The Custer has regular veins with good walls, but not much in sight.

In the Comet a continuous body of ore 540 feet in length has been developed with every indication of a further extension in ore. At this mine a concentrator of 120 tons daily capacity is at work, which in ten months has concentrated 20,644, notwithstanding many delays and stoppages. A wire-rope tramway conveys the ore 2 miles, saving $2 per ton. In the Rumley, about 750 feet of levels have been run opening only a quantity of ore-ground about equal to that stoped out in the same time. It is expected that cross-cutting will develop ore.

Output of the mines September 30, 1883, to September 30, 1884.

	Tons.
Comet mine:	
Concentrating ore	20,650
First-class ore	111
Carbonate ore	122
Concentrates, 4,787 tons.	
Alta mine:	
Smelting ore	441
Concentrating ore	12,497
Concentrater, 4,782 tons.	
Rumley mine:	
Smelting ore	719
Milling ore	3,478
North Pacific mine, concentrating ore	319
Custer mine, concentrating ore	110
Total quantity ore operated	38,441

Comparative statement of ore reserves at the time the company commenced operations and on September 30, 1884.

	Tons.
September 30, 1883:	
Comet	12,000
Alta	9,000
Rumley	3,000
Total	24,000
September 30, 1884:	
Comet	45,000
Alta	17,000
Rumley	3,000
Total	65,000

On the Alta, Comet, and Rumley there have been driven, in the aggregate during the past year, 4,600 feet of levels and 1,220 feet of winzes have been sunk and raised. A large part of this work was in new ground previously unexplored, and resulted in the discovery of extensive ore-bodies. The Alta lode shows more ore than ever before, and recent surveys of the Comet mine give the assurance of a future output sufficient to keep the reduction works supplied for two years if necessary, without taking out any supplies from the ground below the 225-foot level, where the pay is best and the indications most promising.

The Helena Mining and Reduction Company is now contemplating the enlargement of its facilities for the reduction of its increased supplies of ore. The company has had in its employ 400 persons, and the works have been run continuously. The entire production for the year 1884 has been in gold 4,605.84 ounces of the value of $95,202.71, and 620,950 ounces of silver, of the value of $651,997.50, besides 6,837,031 pounds of lead, and 72,491 pounds of copper, aggregating nearly $1,100,000 in value.

The Gregory mine, 2 miles from Wickes, and 23 miles southwest of Helena, owned by the Gregory Consolidated Mining Company, is one of Montana's most widely known silver-lead mines, and has the past year sustained its reputation as a heavy producer. It is well equipped for the economical handling of its ore product, and new additions are being made as fast as required. The mine is developed by two shafts 1,000 feet apart, 700 feet in depth, and connected on each level, except the lowest, where drifting is actively progressing. Large bodies of an excellent grade of ore are shown in the lower levels, there being between the fifth and sixth levels alone a block of developed ore estimated to contain many thousand tons. Though the mine produces some high-grade ore, the bulk of its output is of a low grade, susceptible of easy and inexpensive concentration. In its crude state the latter assays 15 per cent. lead, $12 in gold, and from 10 to 100 ounces in silver. The pay ore between the walls of the vein varies in width from 6 to 14 feet. The concentrates before being smelted are put through reverberatory furnaces, and are then reduced to bullion. During the year ending December 31, 1884, the main shaft has been sunk 200 feet additional, the sixth level advanced 100 feet, and the seventh level 40 feet. The company has shipped in the same time 161,496 pounds of base bullion in bars, besides 54,840 pounds of copper matte. The total output in gold, silver, lead, and copper has been about $250,000.

The Elkhorn Mining Company was organized about one year ago for the purpose of working and developing the A. M. Holter lead, located on the Elkhorn Creek, a tributary of the Boulder River and about 35 miles southeast of Helena. This mine is opened by a main in-

cline shaft sunk to the depth of 450 feet with four levels at the 200, 300, 350, and 450 feet stations. The vein is from 6 to 16 feet wide and carries 60 ounces of silver to the ton and a small percentage of gold. Developments and explorations disclose the ore-bodies to be 40 feet long at the 200-foot level, 130 feet long at the 300-foot level, 170 feet long at the 350-foot level, and 225 feet long at the 450-foot level.

Prior to the organization of the Elkhorn Company the ore had been treated in a wet crushing mill, which had not been able to save over 50 per cent. of the silver. The new company displaced the old mill by a 10-stamp chlorodizing mill. A marked improvement at once resulted, the present mill saving 90 per cent. Since then new appliances in the way of settlers, amalgamating pans, roasting furnaces, &c., have been added and the equipment is now first class. The average amount ot ore daily treated in the mill is 11 tons, and it is stamped very fine and amalgamated in a combination pan without grinding. The bullion product is about .700 fine in silver and a little gold, the principal alloy being copper. For the ten months ending December 31, 1884, during which the new works have been in operation under the existing management, the mine produced in silver $168,375.45, and gold $2,320.55, making a total of $170,696.

Bald Mountain district is in the northwestern corner of Jefferson County, about 20 miles from Helena, and is also a continuation of Red Mountain lodes in character of ore. It is about 3 miles from Red Mountain and is the source of Basin and Cataract Creeks. The principal quartz vein in it, commencing at the north of Bald Mountain, is the Little Jennie, from which large shipments of ore have been made. The ore contains galena, zinc, and gray copper, and the width of the vein between the walls is, in some places where it has been cross-cut, over 30 feet.

To the eastward, about one-half mile, is the General Garfield lode, the ore of which contains gold and iron pyrites. At the surface there are several thousand tons of free-milling ore, mostly low grade. Further up, near the summit of the mountain, is the Lucky Jim lode, carrying gold, some of its ore being very rich. About 80 feet from this vein, and running nearly parallel with it, is a silver vein of comparatively low grade ore. Both of these are strong and from 5 to 10 feet in width.

Passing to the east side of the mountain, at the head of Cataract Creek, is the Climax lode, a gold-bearing vein about 3 feet in width carrying rich ore. About 1,000 feet southerly is the Buckeye, carrying both gold and silver. The vein is from 5 to 6 feet wide, the ore containing about $100 per ton.

On the south side of the mountain are the Sabine, Silver Grey, and Little Etta lodes, all containing good concentrating ore and veins from 4 to 10 feet wide. About 2 miles east of the summit of Bald Mountain is located the vein on which are the Athens and Corinth claims, showing fine concentrating ore, rich in lead, and averaging about 5 feet in width. To the east of this vein is the Argentine mine, with a vein 7 feet in width, carrying arsenical iron and galena, with both gold and silver.

The Elk Park district, situated in the remote western part of the county, contiguous to Silver Bow County, shows a more encouraging outlook than that at any time in the past. Here the Summit Queen Mining Company has been pushing the work of development on a group of leads of promising character, among which are the Summit Queen, Blind Treasure, Powhatan, and Grand Prize. On the Blind Treasure the shaft is down 40 feet, but is sunk on a 4½-foot ledge of ore, which

gives an average assay of 35 ounces of silver. The shafts in the others are similar in depth, but are, however, on the veins.

The Grand Prize has been opened on top from wall to wall and disclosed to view a 40-foot vein. The company has recently started a tunnel from the north side of the mountain and have advanced it already 295 feet. It is expected that this tunnel will strike the main lead of the Blind Treasure and Grand Prize at a depth from the surface of 175 feet after running the tunnel 250 feet further. The work is being pushed very rapidly. Another tunnel has been started from the west side, which will have a length of 1,500 feet and strike the main body of ore in the Summit Queen at a depth of 450 feet, from whence cross-cuts and drifting will be done. The company possesses the means to accomplish the work laid out and is expending it judiciously.

Fourth of July district.—The Major Budd mine has been worked mainly in the way of development for three years. The old tunnel is now 385 feet, where it strikes an ore body at a depth of 175 feet. Its ore, from winze, assays 22 ounces of silver. A new tunnel, beginning on the extension of the Major Budd, is now in about 300 feet. The tunnel is 9 feet wide, and the foot-wall shows several inches of rich talc. Depth from surface, at which the tunnel will reach on lead, will be 450 feet. The ore recently extracted averaged 27 ounces of silver and carried considerable lead. On the completion of this tunnel another shaft will be opened and hoistingworks, and a 10-stamp mill erected. The Mollie Childs, the Fourth and Fifth of July, the Rocky Mountain, and other mines in this district have all been worked the past season, and the results obtained justify the further expenditure of money for development. From the Mollie Childs mine its owner has been taking out 5 tons of ore daily for some time, which averaged nearly 400 ounces to the ton. A steam hoist is in process of erection, and when completed the working force will be increased.

The Fourth of July lode has, until recently, been idle. At present a large force of men are engaged in sinking and running a tunnel south from the east drift. They expected to encounter the main vein at a distance of about 50 or 75 feet from where work was resumed and at a depth of about 100 feet.

Cataract district is situated almost north of Basin City, along Cataract Creek, which flows into the Boulder at this point. The district is full of quartz discoveries; the majority of them, however, are undeveloped, except by such annual work as was required in representing. Some of the properties on which considerable work has been done show good bodies of ore.

Among the most valuable mines in the district may be mentioned the Boulder Chief, which is a well-defined lead, that can be traced for over 1,000 feet. The ore is a handsome yellow chloride, and battery assays give 71 ounces silver, with some copper and a trace of gold. The ore is free milling and is very easily extracted. The vein is 27 feet in width and is tapped by a tunnel at a distance of 111 feet from the mouth at a depth of 85 feet from the surface. Two shafts are also sunk upon the vein. The ore is to be treated at the Amazon mill at Boulder City.

The Silver Butte mine had until recently been worked with indifferent success, but late in the autumn its owners, while sinking their shaft at 60 feet exposed to view a body of 500-ounce free-milling gold and silver ore (500 ounces in silver and $18 in gold). The vein is 8 feet in width, and so far as exposed shows every indication of permanency. The ore is also being shipped to the Amazon mill.

The Custer mine has a vein 8 feet in width, from which free-milling

ore, assaying from 20 ounces (the least) to 250 ounces, has been taken from the main shaft, now on the lead, at the depth of 65 feet. The owner of this valuable property is now engaged in actively developing it.

The White Pine lode has a shaft 50 feet deep and shows a 7-foot vein of good ore carrying nearly 50 ounces. The owners have of late devoted their time and capital to its development.

The Kit Carson shows a well-defined vein 30 to 40 feet in width, on which work is progressing, in both shaft and tunnel. Thirty tons of ore recently shipped to Wickes went 30 ounces per ton

The Mohawk, on Cataract Creek, about 2 miles from its mouth, has five shafts, varying from 15 to 40 feet in depth, all showing the same character of ore. The vein is in granite and 8 feet wide. The ore carries silver and lead in paying quantities.

In the *Boulder district* there has been a marked improvement during the past year. Besides a good deal of development by mine owners there have been a number of new discoveries, but as yet only a slight return for the money and labor invested. This is principally due to the fact that with the exception of the Amazon works, located near Boulder City, the county seat, the district is without means for working its ores or even concentrating them. The Amazon works, besides being limited in capacity, are too remote from most of the properties to admit of hauling the ores there for reduction. The mines include both milling and smelting silver and also gold-bearing ore. Besides the mines, several gulches have been worked profitably for placer gold.

The Mollie McGregor mine has attracted considerable attention the past year, because of the valuable character of the ore extracted. A vertical shaft has been sunk 110 feet on the vein, and from the 110-foot station levels have been run 50 feet east and west in bodies of galena ore, which assays from 75 ounces to 125 in silver and 60 per cent. lead. Hoisting works have been erected, pumping machinery put in, and everything done to put the property on a solid basis. Recently a body of very rich silver ore was struck, assaying from 150 to 200 ounces, and the owners are engaged in actively developing it.

The Relief, located a quarter of a mile northeast of Elkhorn mill, is a recent discovery and has a shaft 20 feet deep. It has a vein 12 feet wide, improving in depth, both in width and quality, carrying silver ore which gives assays of 50 to 100 ounces silver per ton.

The Homestake, about three-quarters of a mile northwest from Elkhorn mill, has a shaft 45 feet in depth with a vein 4 feet wide, assaying up to 200 ounces silver per ton.

The Union, about a mile northwest from Elkhorn, has a shaft 80 feet and a tunnel 240, both well timbered. The ore yields from 80 to 350 ounces silver per ton.

The Paymaster, located about 400 yards north of the Elkhorn mill, has two shafts 20 feet deep with a vein 4 to 5 feet in slate and dolomite. The ore assays as high as 125 ounces in silver per ton and 35 per cent. lead.

The C. & D., about a mile northeast from the Elkhorn mill, has a shaft 40 feet, with a tunnel 38 feet and a vein 12 feet wide, in limestone formation, yielding concentrating ore, which assays up to 125 ounces silver per ton.

The Dunston, about 600 yards northeast from the Elkhorn mill, on the east side, has a shaft 38 feet in depth, with a vein 5 feet wide and improving in depth. The hanging and foot-walls are in dolomite. The *concentrating* ore assays up to 200 ounces silver.

The James R. Keene, about 300 yards north of the Elkhorn mill, adjoining the A. M. Holter (the property of the Elkhorn Mining Company), has a shaft 90 feet in depth, with a drift 42 feet in length, yielding ore that gives high assays of both gold and silver. The hanging walls are slate, the foot-walls dolomite.

The Monte Christo, about 1,000 yards west of the Elkhorn mill, has a shaft 46 feet deep, with a vein 10 feet wide, in slate and granite formation. The ore carries 35 to 40 per cent. copper.

The Sophia, adjoining the Elkhorn mine on the southwest, has two shafts 35 and 18 feet, with a vein 15 feet, in dolomite. The ore is concentrating and milling, and assays 50 to 90 ounces silver per ton.

The J. H. Shober, joining the A. M. Holter lode on the south, has a shaft 50 feet deep, with an incline from same 50 feet deeper, to intersect the vein, which is 3 feet wide. Ore carries both gold and silver. The vein is in slate and dolomite.

The Mountain View, about 1½ miles north of the Elkhorn mill, has a tunnel run 30 feet on the vein, but no shaft. The vein is 3½ feet wide, in slate and syenite. The ore carries 75 to 80 ounces silver, and 32 to 40 per cent. lead.

The Luxemburg, about half a mile south of the Elkhorn mill, has a shaft 35 feet deep and vein 6 feet wide in granite. The ore carries gold, silver, copper, and lead.

Indian Creek mining district lies 10 miles west from Boulder City, and takes in the headwaters of Indian Creek and several tributaries. Placer diggings were first discovered and worked successfully in this region, and some of them are being worked to-day with good results. Much prospecting has been done in the mountains and foot-hills and some discoveries of good ore made. A few of the locations are being worked, some are patented, and some waiting for capital to carry on thorough development.

The Silver Wave is among the recent discoveries and is now being developed. One shaft of the mine is down 60 feet on a 4-foot ledge of ore, with both walls well defined. The vein has been traced 1,000 feet east and west. The ore carries gold, silver, and lead. The average assay from many samples shows 107 ounces silver and $29.66 in gold and 51 per cent. in lead.

The Little Giant has been worked for the past fourteen years successfully, and is paying regular dividends. Three tunnels have been run, the lower one being in 1,200 feet. The work is done entirely by tunnel and stoping on the vein, which is but 6 to 10 inches wide, yielding a regular output of $60 and $70 in gold rock, which is treated in a 6-stamp water mill. The owners extract and mill 6 tons of ore every twelve hours.

The New Prospect, adjoining the Little Giant, has a vein of similar width and equally rich. The ore is very tractable and is all left upon the dump pending development. The vein is encountered about 50 feet from the surface and is reached by two shafts.

The Silver Bell mine lies 7 miles west of Radersburg, in no organized district, but in the main ridge dividing Boulder and Crow Creek Valley. This mine was located in March last, and it promises to be the most important in this section of the county. A tunnel was first run in about 40 feet, when it struck the main body of galena ore. The hanging wall alone was found, and an upraise to the surface was made, after which the shaft was sunk about 10 feet lower, where the ore-body gave such strong proof of permanency and positive evidence of a true fissure vein, that the owner began extensive development. The vein is

clearly defined for a distance of 1,000 feet southeast and nearly 2,0 feet northwest. The ore is uniform and assays 78 ounces silver and per cent. lead.

The Ned lode is the northwest extension of the Silver Bell. The ve is 7 feet between the walls and has 3 feet of almost solid galena. Tl vein has been widening gradually, and steady work is going on. A says show that the ore carries 212.90 ounces silver and 1.46 ounces gol The Silver Bell and Ned leads both carry a trace of copper and sou manganese.

The Skinner lode is located about 2 miles northeast of the Silv Bell. The vein has been opened by two shafts 200 feet apart. Tl character of the ore is gold-bearing, carrying silver, galena, and coppe The ore worked thus far has been by arrastra process, and but $12.7 has been saved to the ton. Assays, however, show that it runs $30 p ton in gold, and with proper treatment it is believed that a large pa of this can be saved. The vein has widened gradually from the top an is about 4 feet in width.

The Surprise lode was found in October last. The lead has bee traced 700 yards, and two shafts, 25 feet in depth each and 45 feet apar have been sunk. Ore is being taken out of the vein-body. A drift i being run to connect both shafts, and the ore proves of a uniform cha acter. It is treated by a single arrastra. A 5-ton test recently by th arrastra gave $35 per ton in gold. In the spring a second arrastra wil be employed. The ore is free-milling, and $3 per ton silver is take from the dust. The vein is 3½ feet in width.

The Washington mine, located about 8 miles southeast of Galena shows a vein of ore about 4 feet wide, being galena and silver opened for a distance of about 300 yards, worth about $100 per ton.

The Tycoon, one of the locations on the above vein, shows about feet wide at the bottom of a 40 foot shaft.

The Hennepin, Glasgow, and Liverpool are locations on the sam vein, all showing ore with pay from $60 to $400 per ton.

The Iron Age lode is about 6 miles from Jefferson City, on Beave Creek. The ore is an iron-stained quartz, carrying free gold in goo paying quantities. The vein is opened to the depth of 350 feet, an there are over 1,000 tons of ore on the dump. About 2,000 feet north west of this mine is a vein about 5 feet in width, carrying carbonates o lead and silver, which is opened for several thousand feet, on which ar the Cleveland, Freeman, and other locations.

The Maude Thompson, about 2 miles west of the Comet and Rum ley mines, is supposed to be a continuation of the same. It has tw shafts, 50 and 20 feet deep. Only one wall (granite) has been foun thus far. A drift has been run 15 feet from foot-wall across the vei The ore assays from 30 to 230 ounces silver per ton, and carries som gold.

The Minah mine lies about 1½ miles northwest from Wickes. It ha three shafts, 118, 65, and 35 feet deep, with drifts from shaft to shaf The vein is in granite and 5 to 6 feet wide. The ore is silver bearing and carries some gold.

The Solo, Monte Christo, and Standard mines are situated on Va paraiso Mountain, in a direction northeast from Wickes. They carr silver, lead, and copper, with some gold, and are developed by tunnel run to the vein, which they cut at depths varying from 150 to 500 feet also by shafts varying from 20 to 50 feet in depth. The country roc about these mines is porphyry, granite, and quartzite.

The Eureka, about 400 feet west of the Wickes works, has a shaft 20 *feet deep* and a tunnel on the vein 500 feet in length. The vein is fro

1½ to 2 feet wide, carrying smelting and concentrating silver ore, assaying about 125 ounces to the ton.

The Rocky Bar, joining the Eureka on the north, has a shaft 50 feet deep and a tunnel 450 feet in length, 250 feet of which is on the vein. The vein is 4 feet wide, carrying silver ore, some of which assays from 50 to 300 ounces per ton.

The placer yield for 1884 has been somewhat in excess of the product for 1883. No new fields have been reported, but the season has been unusually long and favorable for placer working, and water abundant.

The product of the county for the year 1884 was $204,396 in gold, and $1,048,153 in silver; in the aggregate, $1,252,549, proportioned as follows:

Whence received.	Gold.	Silver.	Total.
Helena Mining and Reducing Company	$95,202	$651,997	$747,199
Gregory Consolidated Mining Company	15,000	200,000	215,000
Elkhorn Mining Company	2,320	168,375	170,695
Amazon mill	1,500	15,000	16,500
Little Giant	6,000	.....	6,000
Received at Helena assay office from placer workings	70,374	2,781	73,151
By other mines, placers, assay offices, and Chinamen (unreported)	14,000	.....	14,000
Ore shipments	.....	10,000	10,000
Total	204,396	1,048,153	1,252,549

LEWIS AND CLARKE COUNTY.

During the year 1884 the gold and silver production of this county was nearly double the production of the preceding year. The gain is owing entirely to the increased operations in quartz mining, which, in 1883, was not up to its usual average. There is still much placer ground in this county that can be worked at a profit, of which a large amount is under the control of Chinamen from whom it is not possible to obtain information. While it is possible for the miners to receive full value for their gold bullion at the United States assay office at Helena, it is known that a considerable amount is sent out of the territory each year, especially by Chinese miners. The placer yield in this county for 1884 was nearly as large as that of the preceding year, though the amount received and credited to this county at the assay office at Helena was but $95,000.

Last Chance and its tributaries are still producing. As nearly as the figures can be obtained the yield for 1884 was as follows:

Last Chance Gulch:	
William A Chessman	$11,000
Getchel & Co	5,000
Chinamen and others	5,000
Tucker and Dry Gulches:	
R. S. Hale	7,500
Others	1,000
Unionville:	
P. H Constans and others	2,000
Park City and vicinity	15,000
Oro Fino Gulch	1,000
Basin Gulch	2,000
Ten Mile, Try Again, Monitor, and Lower Basin Gulches	5,550
Silver Creek	9,000
Slaughter House Gulch	1,200
Nelson Gulch	6,000
Green Horn and Saint Louis Gulches	15,000
Virginia Creek	4,000
Missouri River Workings	4,800

The lode claims in the vicinity of Park City have scarcely been tou during the year, and the product is consequently very small.

Ten Mile district is about 18 miles south from Helena and is approa by a good wagon road along Ten Mile Creek. There are about hundred well-known leads in this district, of which fifty are pate Some of them have been worked for a number of years, the high g ore having been selected and shipped, but during the past two y their development has been especially notable.

Among the most important is that of Messrs. Churchill, Murp Buchanan, under the corporate name of the Capital Mining and Mi Company. This company has a fortunate location and ample mean concentrator, in every respect as perfect as experience in mill buil knowledge of principles involved, and appliances needed in handlin ores successfully could construct, has just been completed. The pr capacity is 50 tons per diem; but it is so arranged that its capacit be doubled by merely placing more tables in the space allotted to and connecting them with the power. The main building is 40 feet 32 feet wide, and three stories high, with an ore shed in the rear 32, boiler and engine house 20 by 40 on one side, and on the othe building for concentrators 28 by 40, making an aggregate fronta 80 feet and depth of 60 feet, and 50 feet from base to peak of roof. ground sills are 16 inches square, and the posts and other parts o frame 12 by 12 inches, all mortised and strongly braced; and in the building there are four columns, 12 by 12 inches between the floors, are 12 feet apart in the clear; there are four bents 12 by 12 inches, by 6 by 6 inch timbers, under each floor. The boilers have a capac 120 horse-power, and the engine is a high speed, slide valve, made Union foundry. The crusher, through which the ore passes in it liminary preparations for concentration, is the invention of Mr. Buchanan, who is an adept in the business of milling and a well k inventor of appliances for treatment of ores, and is capable of crushin tons of ore per diem, though expected to treat only 60 tons per day. this crusher a conveyor carries the produce to the first set of 3 chilled-iron rollers, and thence it goes to the second set of 24-inch speed rollers, where it is made sufficiently fine for screens, and from rollers it is carried in an ordinary elevator to the peak of the roof an charged into the screens. Any ore not fine enough to pass through goes back to the rolls, and the prepared mass is discharged into holding 50 tons each on the second floor, and from these bins the fed to the "golden gate" tables on the first floor, where it is co trated. It will be noticed that all this manipulation of the ore, the time it enters the crusher until it is finally concentrated, is matic, and the saving of labor is one of the chief sources of profit i treatment of the ores. The mill is supplied with water to the ext about 100 inches, which enters through the roof into a tank on the floor, and from this the overflow is carried to a tank on the second from which it is conducted to the concentrator or to the sluice-l as may be required, and in case of necessity the entire building c flooded from the roof with such a quantity of water as to preclu possibility of any serious damage by fire. Of the mines owned a erated by this company, the Micawber, Coyne, and S. P. Basset the best known, though the Providence, Susie, and Minnie Le good promises. The Micawber is developed by a shaft 80 feet from which the levels have been run east and west 40 and 25 fe spectively, and the pay streak is found to be 4 or 5 feet wide, and c *$45 in silver* and $20 in gold to the ton. The assays from gray c

or fahlerz, have ranged from 166 to 196 ounces of silver to the ton. Coyne shows a vein from 8 to 15 feet wide, the Morrison 4 feet , and the S. P. Bassett shows a strong vein, which is estimated to age 60 ounces of silver to the ton. From these properties consid- le ore is on the various dumps now available for the mill.

the western slope of the Red Mountain and about 1 mile from oncentrator, is located the Russell group of mines, and a number hers adjacent to them.

e American Flag and Southern Pacific, the property of J. H. Rus- re parallel to each other, the latter being about 150 feet south of lag. A common tunnel intersects both leads, which are about 4 in width, and show a high grade of ore. Development is being etically pushed.

e Montana lode has a 60-foot shaft. The lead is about 6 feet wide ncreasing as depth is attained. Two feet of the ore is fine smelt- re, rich in galena.

e American Flag is situated on the divide between Ten Mile and Gulches. During the past winter a shaft has been sunk upon it listance of 30 feet, and developed a lead about 6 feet wide, between yry walls, the ore-body averaging 30 ounces in silver to the ton. work of development is being vigorously prosecuted.

e Frohner, situated on the east side of Ten Mile, has been devel- by a shaft to the depth of 130 feet. The ore-body is from 4 to 5 in width and is very rich, assaying as high as 250 ounces of silver to on. Levels have been run east and west from the main shaft, one listance of 14 and the other 60 feet. The work of development is rapidly forward, quite a number of men being employed.

e North Pacific and Bassett are also in the Russell group, and g the best mines of the district. In character the ore is about the as those described. On the dumps of these mines, together with merican Flag, are about 5,000 tons of ore, and the work of de- ing them is being energetically pushed.

ar these mines are the Micawber, Eureka, Silver Cord, Livingston, Washington, and Sallie Bell.

the west side of the Ten Mile is located the Lee Mountain, Bis- k, Bruce, Gratton, Robert Lee, and many others, all of which have developed during the year and give promise of becoming pro- rs.

the Drum Lummon, the Cruse mill was started up in April with ldditional 10 stamps, making a total of 20 stamps, which has since pounding on ore from the Cruse level. The Maskalyne tun- named after the president of the company, was also started the mouth. This tunnel was to tap the ledge at a distance from its h of about 1,200 feet and at a depth of 400 feet. The success of ndertaking exceeded expectations. The ore-body was struck at a nce from the mouth of 1,147 feet, and a level was started westerly, at a point 100 feet from the tunnel an upraise was started which con- ed with a winze sunk from the Cruse tunnel level. Further ex- tions were also actively prosecuted, which demonstrated the fact the ledge at 400 feet was, in character and richness of ore, width of , and productive capacity, greatly superior to the ore in the upper ings. The walls were found well defined, more regular than in the r workings, and the indications of prominence more pronounced. ore body was at once cross-cut. Active explorations were pushed ard and sufficient ground opened to give an intelligent idea of the ense productive capacity of the property. The Maskalyne tunnel

is designed to be the main working tunnel of the mine, and was co
structed to answer all the requirements of the future. It is wide enoug
for a double track, thus permitting cars going in opposite directions
pass each other. The work was done by hand and well done, the tu
nel being so straight and the timbering so accurate as to scarcely va
from a true line. The lead has been developed 800 feet along the vei
Its width is known to be 80 feet, and this new tunnel has demonstrat
the fact that its depth is, at least, 600 feet. These figures refer to t
body of solid ore, sufficient without further development to requi
many years in its extraction. An experimental run was made in t
old Cruse mill and the result was so profitable that the erection of a
stamp mill was decided upon. This work was begun in June and t
company's interests were so actively pushed forward that the first
stamps dropped on ore within three months from the time the excav
tion was completed; during the next thirty days 30 more stamps we
added, which, combined with those then in operation, made a total of
stamps, all wet crushing. The new mill is well equipped, and perfe
in every detail. It is so arranged that roasters can be put in shou
the ore become too base for free milling, and all modern appliances
prevent loss, insure economy of operation, and to work the ore to
high percentage of its value have been secured. The dimensions a
224 by 119 feet. The machinery is of San Francisco manufacture, wi
power capable of running 60 stamps. It is set on a solid foundatio
and is simple of construction, while in point of durability, compactnes
and capability it is the equal of such mills as the Lexington and Mo
ton, of Butte. The location of the new Drum Lummon mill could not l
improved. It stands just below the main tunnel, and can be supplie
with ore at very slight expense. Among the improvements is a revol
tion counter in the engine-room, a quicksilver ram for forcing the quic
silver up into each of the ten pans. There are five settlers, two clean-
pans, and two agitators, and a tram-way and car for conveying the am
gam to the retort and melting-house. The batteries have screens wi
dust-proof shutters over them, and closed boxes with worm conveyo
for carrying the pulp to the elevator, like a flouring-mill. Under t
hopper is a Fairbanks scale and car, with a tramway running along t
pans for distributing the pulp. There are self-feeders, rock-breake
spacious ore bins, with fire shoots over the drying floor, and large ve
tilators on the top of the mill. Above all this is a 700-foot 3 rail tra
way to bring the ore down from the upper works, and close by is t
Maskalyne tunnel, 1,150 feet long, 7 feet high, and 5 feet wide at t
bottom, and 4 feet at the top, with a double track half the length
the tunnel to allow the cars to pass each other. The large air co
pressor is built on the ground, made from the *débris* taken from t
tunnel, as is also a large ore-house near the entrance. In front the
is a small area of flat bottom land, about 5 or 10 acres in extent, us
as a wood yard. One contract for 5,000 cords of wood was let at $4.
per cord delivered. The wood has to be hauled about 5 miles from t
west side of the range, where there are thousands of acres of forest. T
ore is brought from the mine both by way of tunnel and shaft, the l
ter descending into the mine some distance up the hill from the m
and the ore brought down to the dump or chute by means of cars up
an elevated tramway. All operations in the mine in the way of hoi
ing, drilling, &c., are done by means of compressed air, for the co
pression of which one of the largest air compressors made is in use
the mill. It is of 500 horse-power, and has its own special engine. Th
first clean-up from the new mill was made in May, after a run of le
than thirty days, when only the 20 stamps first erected were in oper

tion. This run was entirely experimental, the mill at that time not having been turned over to the company, and the result, in bullion, which amounted to about $20,000, was but a confirmation of the richness of the mine. The samples of ore from the lower tunnel assay, on an average, $64.50. For some time past the production has been nearly 150 tons of ore per day, the bulk of it being taken from the Cruse level. The general manager has furnished the following figures concerning the product for 1884: Gold, 7,150 ounces; value, $147,790.50; silver, 97,100 ounces; value, $101,955. Persons employed, 135; days employed, 365.

A short distance from the Drum Lummon on Cruse Hill is the Empire mine, which is sufficiently developed to prove that it is a property of value, and a company has been organized to work it. The Robert Emmet lode, a short distance from the Drum Lummon on Cruse Hill, is not sufficiently developed to determine its extent, but some rich free-gold rock has been struck, and the outlook is promising.

From Silver City to Marysville there are observable the old workings of the placer camp. The entire bed of the stream has been washed over, and the promiscuous heaps of gravel lie about as the miners left them fifteen years ago. Some placer mining is still done in this vicinity, principally by Chinamen, though as usual in such a case it is difficult to estimate the amount. There are a great many leads in this district, many patented, some only located.

Bald Butte district.—The Albion mine has shown up well, and during the fall of 1883 a new 10-stamp mill was built on this property, new hoisting works erected, and the mine generally equipped for handling its ores economically and thoroughly. The result of the past year's operations has more than justified the expenditure made in 1883, and fully comes up to the highest expectations of the parties interested. The development of the Albion has been steadily and economically pushed, and has confirmed the prediction of its becoming a valuable property. The mine has now a shaft 180 feet in depth, and four levels from the shaft at intervals of 50, 100, 150, and 180 feet, which are developed 800 feet along the lead, showing a strong body of ore throughout and insuring the permanency of the mine. The output of gold and silver during the year amounted to $36,127.41, of which about 70 per cent. was gold.

The Blue Bird and Hickey mines are about a mile distant from the Albion, near the summit of Bald Butte Mountain. Their 10-stamp mill has been operated during a part of the year only, and a portion of that time has been operating experimentally upon ore from the Empire lode, which is not far distant and belongs to the same parties. Considerable development has been done on the Empire, and the ore has proved very rich, but the larger part of the ore crushed was from the mines first mentioned. The owners of these mines having been convinced of the richness and extent of the Empire, purchased the 10-stamp mill of the Whippoorwill mine. The new owners are putting it in shape for operation during the coming season. The total production for 1884 was between $18,000 and $19,000, 60 per cent. being gold. The development has been steady and thorough; the ores are mostly free milling, running from $30 to $50 per ton. The Blue Bird is down 300 feet, with eight levels, and works from 25 to 30 men.

The Belmont mine and mill have not been operated during the past year, but arrangements are in progress which will probably lead to an early resumption of operations.

The Gloster mine, owned by the Boston and Montana Gold Mining Company, continues to improve in appearance as developments progress, and is considered among the best mines of the Territory. The mine is

thoroughly equipped with hoisting works, and has every facility for raising an immense amount of water, the pumping capacity being about 1,500 gallons per minute. The shaft, 18 feet 6 inches by 7 feet in the clear, has three compartments, two for cages and the other for pumps, and is down 400 feet. There are four levels, one for each 100 feet depth of shaft, connected also by permanent two compartment winzes, one on either side of the shaft, used for ladder-ways and ore-chutes. Considerable stoping has been done, and at a distance of 30 feet along the levels are chutes, rendering it easy to load the ore at once in cars on the level below without being handled a second time. During the past year the upper or 20-stamp mill of the company has not been running, all operations being confined to the lower 60-stamp mill, in which much improvement was made in 1883, and many new features added in the "pan and settler" process. This mill has a capacity of 180 tons per twenty-four hours, the ore having been mostly taken from the east end of the mine. From the 300-foot level a winze was sunk 75 feet west of the shaft to connect with the 400-foot level. The ledge was of solid pay ore, with an average width of over 14 feet at the bottom between well-defined granite walls. In the 1,000 feet opened along the vein, there has not been a break, and never less than 4, and as high as 20, feet of ore. The ore has been extracted from a regular system of stopes in which there are 36 faces, each affording room for 3 miners, and the output has been about 150 tons per day. The ore averages about $18 in gold and silver, of which it is claimed about 50 per cent. is saved in working. The cost of milling varies from $5 to $7. There are 24 pans and 12 settlers, 56 settling tanks, 4 boilers and 2 200 horse power engines. The mill is lighted at night by fifteen electric lights. The mine and mill, which are about half a mile apart, are connected by a three-rail tramway with a double track in the center, over which the ore is transported at a cost of about 5 cents per ton. One car in descending draws up the empty car.

The following is the development accomplished during the year, as given by the general manager:

Levels.	January 1, 1884.	January 1, 1885.	Advance.
	Feet.	*Feet*	*Feet.*
First level:			
East	582	642	60
West	317	317	.....
Second level:			
East	491	603	112
West	243	294	51
Third level:			
East	239	620	381
West	262	419	157
Fourth level:			
East	.....	396	396
West	.....	288	288
Total	2,134	3,579	1,445

CARS HOISTED.

First level, east	1,441
Second level:	
East	7,891
West	20
Third level:	
East	27,109
West	14,495
Fourth level:	
East	13,454
West	18,363
Total	82,773

Mr. H. W. Child, the general manager, has also furnished the following figures from the company's books, relating to the production during 1884:

Ore extracted	tons..	51,842
Ore reduced at mill	do...	47,300
Average assay of 367 battery samples		$17 45
Average assay of 582 tailing samples		8 69
Amount saved per ton per average assay		8 76
Forty-seven thousand three hundred tons of dry ore at an average saving of $8.76		414,348 00
Amount actually saved as per bullion receipts		412,056 91
Total bullion production, ore, tailings, &c		415,056 91
Total disbursements		333,528 63
Net profits		81,528 28

The Boston and Montana Gold Mining Company have a capital of $2,000,000 in 200,000 shares at $10 each. They have paid dividends to January, 1885, aggregating $310,000.

In *Stemple district* a number of gold leads have been opened during the past season, the production of which has occasioned no small amount of surprise and satisfaction.

The Homestake was purchased a short time since by parties who proceeded at once to open up and prospect the mine. The principal work has been done by a tunnel which runs in on the lead for about 500 feet, also by various stopes. For 200 feet the ledge is about 2 feet wide. The ore is very rich and in places free gold is visible.

The Grubstake and Homestake have made good records, and for the amount of money expended upon them have paid well. The vein in each is narrow but rich, as is attested by the mill runs, which have shown as high as $60 per ton. These mines are developed by a tunnel and stoping, and the output of 1884 was about $40,000, of which 60 per cent. was gold.

The Bachelor, on the east of the Homestake, is developed by two shafts 75 and 30 feet deep, disclosing a vein of rich quartz. The ore was crushed at the Homestake mill.

The Badger adjoins the Bachelor on the east and is owned by the same parties. The lead is narrow but rich and only a slight amount of work has yet been done upon it.

On the Alpha a shaft is down 75 feet with a 60-foot tunnel at the bottom, showing a vein from 18 inches to 2 feet wide. The character of the ore is the same as the surrounding mines, and it is claimed will mill $60.

The Omega adjoins the Alpha and is owned by the same company. There are six locations on this lead, each 1,500 feet long, which, as far as developed, show evidence of being good properties. These mines are situated within a half mile of the summit of the main range at the head of Virginia Creek.

The first shipment from the Isabel, consisting of a car-load of smelting silver ore, was forwarded to Newark, N. J., in August last, and averaged high without selection, the lead being about 3 feet thick and very rich. The Isabel is owned and operated by the Quartette Company, and is situated about 7 miles west of Helena, between Ten Mile and Green Horn.

Numerous mines, either on account of limited facilities or because

development has just been commenced, have produced small amounts aggregating about $13,000, mostly gold. The most important are—

Alpha and Omega	$4,300
Keiser	1,800
Hays	600
Bachelor	250
Yellow Boy	350
Shober	250
Whippoorwill	275
Dobbin	125

The following companies were organized and incorporated during the year for the purpose of developing Montana mines:

	Capital.
Bald Mountain Mining Company	$2,500,000
Clancy Creek Mining Company	2,500,000
Crown Point Mining Company	2,500,000
National Mining Company	500,000

The properties of the last-named company are the National Silver lode and National Extension, adjoining the Sallie Bell and Red Mountain.

The total production of Lewis and Clarke County for the year was as follows:

Dust	$95,000
Albion	36,000
Blue Bird, Hickory, and Empire	19,000
Boston and Montana Gold Mining Company	415,000
Drum Lummon	250,000
Various mines	13,000
Homestake	40,000
Total	868,000

Of this amount $610,000 was gold.

MADISON COUNTY.

Placer mines.—Madison County is one of the greatest gold-producing counties in the Territory of Montana. Most of the product comes from placer mines, though the gold-bearing quartz mines, with present developments, promise in the future to outstrip the placers. The gold product for 1884 was heavier than for any year during the previous five years. As near as can be ascertained, the gross yield for the county for the year was considerably more than a quarter of a million of dollars.

Alder Gulch is the largest producer in the county. The lower 3 miles of the gulch are being worked by Chinese companies, about 100 men being employed. A correct estimate of their output cannot be had, as most of the gold goes to San Francisco and China. However, the yield cannot be less than $25,000.

Next above these companies comes the German Bar Flume Company, who own quite an extent of ground in the gulch, which has been a steady producer for the past fifteen years. The yield last year was about $10,000.

Immediately adjoining is the Dyannon and Jones flume, with a yield of $15,000. There are quite a number of smaller companies working in this portion of the gulch, but their gross output cannot be ascertained.

The Fenner ground comes next and is being worked in quite an ingenious way by water-hoisting machinery. The gravel is raised to the *surface in* cars, dumped into a flume, and by the operation of a machine

led a "grizley" the gravel and rock are separated from the sand, ich greatly expedites the work. This mine has been a steady pro- er for years; the yield for last year was $15,000.

Adjoining this mine is the property of the Alder Gulch Consolidated ning Company, with the most extensive body of mineral land held any company in the gulch, which is opened with a 30 by 60 inch flume ile in length. This company barely succeeded in getting their mine proper working order the past year, after a large outlay of money, l the owners have great expectations from it in the future. The ld last year was $20,000. In the spring they will try the experiment working the black-sand tailings from their flume in the mill of the ginia City Reduction Works.

The Hayes and Stevens and several other smaller companies are tak- out considerable gold just above the Alder Gulch Consolidated ning Company's property.

. Parker's flume, next above, has been a large producer for the last een years, and last year's product was at least $30,000.

The Highland Flume Company connects with the Parker property, l is now, and has been, a very large producer and every year has ted its owners encouraging dividends. The last year it produced),000.

The Southmayed flume is immediately above and has developed one the best and most extensive properties in the gulch. The product s $15,000.

Hall & Company come next. This company, taking all the running rs into consideration, has produced more gold than any other com- ny. The product last year was above $15,000.

Eagle Hill, immediately above, yields from $5,000 to $10,000 per r. There are from 250 to 300 white men employed in Alder Gulch ning. These men receive from $3.50 to $5 per day for their labor, l are engaged in placer mining about seven months in the year. ring the other months they are engaged in quartz mining. The ch is 14 miles long. Not more than 1,000 feet are being worked out h year.

Brien's Gulch, situated about 10 miles from Alder Gulch, is being ked extensively with flumes and hydraulics, and during the past nty years has produced considerable placer gold. There are five panies at present working in the gulch who take out at least $20,000 a working season.

Farris's Gulch, running parallel with Brien's and only a few miles dis- , is being worked by three companies with flumes and hydraulics, produces about $10,000 per year. There are several other placer hes in other parts of the county that produce more or less gold each r, worked in a small way. Among the number is *Norweigen Gulch* two companies working it, the Hot Springs and Sterling Creek, last a very fair mine and worked quite extensively by a flume.

Brown's Gulch is worked by three companies with flumes, one of which paid large dividends for the last ten years.

California Gulch is worked by two companies with flumes, who obtain d results.

Carten Gulch is being opened with a flume, and the owners have at expectations, as large prospects have been obtained in the gulch. as been impossible to obtain reports from the smaller gulches named.

The Washington Bar Hydraulic Gravel mine has been developed into per working condition. It consists of 400 acres of patented mineral d, comprising 7 miles of gulches, and gravel bars on the side of the

same. The pay gravel is from 25 to 50 feet in depth, and is probably the most extensive auriferous gravel deposit in Montana. There are connected with the mines 10 miles of canals or ditches, conducting 2,500 inches of water to the mines. The hydraulic and pump facilities are excellent. The improvements consist of one flume 5½ feet high, 30 inches wide, and one-third of a mile long; one flume 2 feet wide, 3 feet high and one-third of a mile in length, and several shorter flumes; also three fine hydraulic plants and a water derrick. The improvements have cost about $100,000, much of which has come out of the mine. The product for 1884 was 838.16 ounces of gold, valued at $13,362.55, which was sent to the New York assay office. Twenty men were employed and the mine was worked one hundred days.

During the year 1884 the placer mines of this county have sent to the Helena assay office $149,500 in dust. Of this amount about 85 per cent. was taken from Alder Gulch.

The estimated product of the placer mines of this county is as follows:

ALDER GULCH.

Chinamen	$25,000
German Bar Flume Company	10,000
Duncan, Welch & Co., Flume	15,000
Fenner	15,000
Alder Gulch Consolidated Mining Company	20,000
N. Parker	30,000
Highland Fluming Company	20,000
Southmayed Flume	15,000
Hall & Co	15,000
Eagle Hill	5,000
Brien's Gulch	20,000
Harris's Gulch	10,000
Washington Bar	13,000
Other gulches	5,000
Total	218,000

Quartz mines.—Quartz mining in Madison County is virtually in its infancy, which can be accounted for in several ways: First, the entire attention of home miners and capital has been absorbed in the more easy, quick, and less expensive placer mining; second, the extreme isolation of the quartz district of the county from railroad facilities (the latter being absolutely necessary for the success of quartz mining), and last and most important, the entire absence of proper quartz machinery for reducing the ore. The owners are diligently developing their mines and hold them in great value. The mines have been noted in the past for the amount of gold ground out of the rock by the old fashioned arrastra, but this process is fast going out of use, and the mines are now being equipped with modern stamp mills, for want of which much gold and silver ore has been heretofore shipped out of this county to Omaha and other points, and although transportation is very expensive, yet the richness of the ore permits the miners to net a reasonable sum on every ton so shipped. The gold taken from quartz in this county and received at the United States assay office at Helena for 1884 amounted to $63,000, almost double the value of that received 1883. Most of this retort (and the same is true of the dust) has been sent to the assay office by Madison County bankers, and it is impossible to get accurately the names of the mines and gulches which produced it.

One of the most promising gold and silver mines in the county is what is known as the Big Chief mine, situated about 5 miles from Ruby *Pine, near* Sheridan village. Samples of ore from it assay from $35

upwards. Other shoots in the ledge assay as high as $135 per ton. The ore found in the mine is strictly smelting, and cannot be worked in any other manner owing to its base character. The mine has been explored to the depth of 100 feet by an incline shaft or adit, which follows the dip of the vein about 45 degrees west. The incline follows the hanging wall, along which is found a rich streak of carbonate ore. The ore when out is assorted and sacked. The best grade is shipped to Swansea, Wales, the less rich to Omaha, while the poorer quality is left on the dump. It is the purpose of the owners to sink the incline 50 feet deeper and cross-cut the ledge.

On the Bullion lode a two-compartment shaft is being sunk, and new machinery is to be put in the 20-stamp mill for concentrating the low-grade ore of this and other mines in the vicinity. Ore from this mine assays from 50 to 200 ounces silver to the ton.

A 70-foot shaft has been sunk on the Toledo mine and a tunnel is being run. Samples of ore assayed $30 gold and $37 silver, and the galena ore 225 ounces silver and 70 per cent. lead to the ton.

The Nelly Darby is being successfully worked, and Bradley & Burnham have a gold lode about 7 miles from Brandon, on Mill Creek, which runs $100 to the ton, worked by an arrastra. The vein is some 15 inches wide.

Bush & Meyers also have a paying mine at this place, the rock averaging from $80 to $100 per ton in gold.

There are numerous other leads in this vicinity bearing gold, silver, and galena, several being worked profitably. A smelter is much needed in this district.

Ramshorn district.—On Ramshorn Creek, a short distance from Laurin village, is the Pedro mine, which produces free-milling gold ore yielding by simple stamp mill and copper-plate process an average of $100 per ton at an expense of $20 per ton for mining and milling. Developments have been made to the depth of 150 feet, and the vein improves in richness and width as greater depth is attained.

Near by is the Galena. The vein is 30 feet in width and is filled with a uniform grade of argentiferous galena, that assays 50 ounces in silver and from 60 to 80 per cent. lead. The ledge has been traced by surface croppings for 2 miles and has been developed to the depth of 125 feet.

The great quartz mine of Alder Gulch is the Prospect. There have been more extensive explorations and developments in this mine than perhaps in any other mine in the county. It is situated in the mountain, west from Alder Gulch, about 1 mile from Virginia City. At the base of the mountain there is a tunnel run in along the vein for a distance of 400 feet, with a free showing of ore both overhead and underfoot. At the end of the tunnel there has been a shaft sunk to the depth of 100 feet, which discovered a fine body of ore, making the deepest explorations nearly 400 feet from the surface. About 500 feet from the base of the hill there has been a second tunnel driven along the vein to a distance of 350 feet, uncovering good ore the entire distance. Still 500 feet above a third tunnel has been driven along the vein for a distance of 300 feet, and, as in the other, developing the same uniform grade and character of ore. There has been no stoping of any consequence done in the mine. Some very rich ore has come out of the tunnels, which has been carefully assorted from time to time and shipped by wagon to Dillon, a distance of 50 miles, thence by rail in some instances to Omaha, others to Denver, Butte, Newark, N. J., and Swansea, Wales, and there never was a shipment from the mine that did not return the owners a handsome profit above the expense of shipping and working. Several of the

shipments went as high as $300 per ton. The ore shipped, however, was assorted out of many hundred tons of lower-grade ore that will not pay to ship, and the great value of the mine lies in the large body of ore. A fair pulp sample of the entire vein matter assays $24 per ton; by a little assorting it goes $50 per ton, and the value of the ore can be increased by more careful sorting.

The Bell mine is located 2 miles above Virginia City, in Linder Mountain. There has been a tunnel driven into the mountain, along the course of the vein, for a distance of 800 feet. Several cross-cuts have been made at different distances from the mouth of the tunnel, and the vein is found to have an average width of 25 feet filled with a uniform grade of ore. The width of the mine and the regular grade of ore make the mine one of the valuable properties in the county. The assay value of the ore is $50 per ton, taking the entire width of the vein. The deepest explorations are about 500 feet from the surface, the greatest depth yet attained in any mine in the county. The explorations made to this time have discovered a body of ore 800 feet long by an average of 300 feet deep and 25 feet wide, and the vein looks just as well along the bottom of the 800-foot tunnel as it did above. The mine is being worked; the output of ore going to increase the already large dumps awaiting proper machinery in the vicinity.

Tidal Wave district.—The Tidal Wave mine, near Sheridan, is developed by three tunnels. The operations are being prosecuted in the middle tunnel by sinking a winze on the vein, a depth of 40 feet having been reached, at which point the vein shows an ore body 2½ feet wide, averaging about $105. The best of the ore is shipped for milling bi-monthly to Omaha, via Dillon, which is the nearest railway station, 50 miles distant.

In *Georgia Gulch* the Saturday Night has been prospected by two tunnels, 25 and 60 feet, and the vein at present shows a width of 12 feet, on the hanging wall of which is a very rich streak of carbonate ore 15 inches in width, assaying 15 per cent. lead and 150 ounces in silver.

The Magnolia has been steadily pushed. The two tunnels have been extended to 100 feet each, and in the eastern one a very rich 3-foot carbonate vein was discovered. Operations were temporarily abandoned at this point on account of the presence of too much water. A force of men are at work on a drain to tap the vein 80 feet below, which will afford the necessary relief. The product of this mine was shipped to Omaha also, and the mill returns show an average of 60 per cent. lead, 25 onces in silver, and 1½ ounces in gold.

The Lulu and Wolverine are of the same character of ore as the Saturday Night, and are supposed to be an extension of it. Work this year has been slight, and only a few feet have been added to the tunnel by way of development.

The Twenty-ton Water Jacket Smelter, owned by a Philadelphia company, erected in 1883, has been buying and working a large amount of smelting ore during the season.

Noah Armstrong's gold mill and reduction works have both been kept busy buying ore from all the principal leads in the vicinity.

The Ned and Willow Creek mines, near Pony, have completed their 20-stamp mill and developed the mines to a depth of 200 feet by a tunnel. They have employed 25 men and have produced in 1884 2,471.11 ounces of gold, valued at $34,967, which was sent to the United States assay office at Helena.

The Mohegan lode, located 2 miles from Red Bluff post-office, is a fine claim and has been mined successfully for several years. It has a

)ld mill of the most improved design, with two Frue van-
lorations have reached the depth of 110 feet, and levels have
that depth 300 feet each way, which have developed a large
y rich ore.

egan is strictly a gold lead, the bullion being very fine in
aving but a small per cent. of silver, the vein and vein mat-
g $75 per ton. Considerable ore from the richest vein of the
een shipped to eastern reduction works, which yielded from
r $1,000 per ton. The lower grades of ore have been stored
and will be worked through the company's mill.

egan produces by far the highest grade gold ore of any mine
ty, and probably there is no mine in the Territory which sur-
this respect. The mine is being worked continually.

:onda mine produced during the year 510 ounces of gold and
)f silver, which was shipped to Helena and New York assay
)e mine has one main tunnel, tapping the vein 321 feet deep,
't of leads and uprises, with about 9,000 tons of ore in sight.
refractory, and there cannot be more than 25 per cent. saved
by the free-milling process, which has been the manner of
e ore thus far. Six men have been employed 269 days. The
e product was about $7,500.

)w Creek Mining district an arrastra has been built, and the
rs are starting to develop their mines. The ore carries gold,
galena. Richter & Co. are tunneling on the Grand Cen-
ly discovered silver lead), and are, with others, preparing to
test the extent and value of their property. The Governor
, near Silver Star, has produced about $10,000 in gold retort
year. A good average run was 55 tons of ore, yielding 187
retort, worth $17 per ounce. Some new discoveries of gold
e been made in this district nearly opposite Silver Star in
n. The vein is said to be 2 feet wide, and assays run as high
$600 per ton. Shafts have been sunk about 15 feet, showing
of a permanent vein.

ilade is being developed by Mr. G. Gaile, of Nevada, and is
e belt as the Lulu and Wolverine. A 50-foot shaft has been
)n account of foul air operations were directed to a tunnel 150
which is now 65 feet long. The ore encountered is carbonate,
to any yet found in the district.

luct of this county for 1884 is estimated as follows:

acer mines	$218,000
iartz mines	75,000
quartz mines	15,000
:er ore shipped	50,000
	358,000

ebted to Mr. Henry Elling, banker, Virginia City, for much
iformation relating to the county.

MEAGHER COUNTY.

)er mines of this county have slightly increased their yield
the assay office at Helena receiving in 1884, $51,371.32, and
9,607.88, which is about all that was taken out. The total
i is estimated as follows:

Gulch	$25,000
ar	8,000
	1,000
	4,000

Avalanche Gulch	$3,000
Magpie Gulch	2,500
Thompson Gulch	1,500
Atlanta Gulch	2,000
New York Gulch	4,000
Kingsburg Gulch	1,500
Oregon Gulch	1,500
Cooper Gulch	1,500
Maiden Gulch	3,000
Total	58,500

Neihart district is situated in the heart of the Little Belt Mountains, on Belt Creek. The mountains on either side rise at a steep angle, ranging in altitude from 1,000 to 3,000 feet above Neihart, the town. The mines thus far are mainly confined to the north side of the cañon The rocks of the district are generally of a porphyritic nature, with some slate and syenitic granite porphyry. The veins strike at right angles to the course of the country rock. The ores are both milling and smelting, the latter a lead ore. A small percentage of carbonate and sulphate of lead is found near the surface in some places, but galena largely predominates. Some of the mines contain free-milling ore, but the gangue of the majority of the veins is sulphate of baryta (heavy spar), the exceptions carrying a quartz gangue. In all there is more or less brown oxide of iron. The work of development has been going on during the year, the ore proving easy to mine. The veins vary in width from 1 to 5 feet and maintain their strength as depth is attained. The ores, so far as ascertained, are of all grades, from a few ounces in silver to several thousand dollars per ton, and the product of many of the mines has been sacked and transported in wagons 100 miles over the mountains to the railroad and shipped to Omaha for treatment, leaving in some cases a good profit.

The Mountain Bell, one of the most promising mines, has a vein 5 feet wide, and has been developed to the depth of 103 feet. The rich streak has widened to 33 inches and assays from 80 ounces upward. The ore taken out has been sacked and shipped to the smelter at Omaha, the company paying as high as $55 per ton for freighting it from Neihart to Livingston, on the line of the Northern Pacific Railroad. Mr. B. C. Kingsburg, of Butte, writes concerning some samples of Mountain Bell ore which he has assayed:

"First sample taken from two sacks of ore which Mr. Chamberlin had set aside, fearing it was not rich enough for shipment to Omaha, assayed 200 ounces in silver. Second sample, from a pile that had been culled over, assayed 99 ounces in silver. Third sample, which was made by grabbing a handful of each, from twenty-three tubs of ore as it came from the mine, assayed $116\frac{10}{100}$ ounces in silver."

This same company now has a force of men at work sinking a shaft on the Minnehaha, which has reached a depth of 111 feet. The lead holds its width and the character of the ore is improving as the depth is increased, enabling them to sack for shipment ore ranging in value from 200 to 800 ounces per ton. When this mine reaches a depth of 125 feet, operations will be temporarily suspended and the force employed will be put at work for the further development of the Mountain Bell.

The Queen of the Hills, Homestake, and O'Brien are being developed under direction of Mr. B. C. Kingsburg, to whom these mines are bonded in the sum of $45,000. The principal work has been done on the Queen of the Hills. They are working on the upper and lower tunnels

and making good progress. The vein is 4 to 5 feet wide and displays rich ore, but not in a solid pay chute. It is disseminated through the vein in "kidney," or geodes, which carry black sulphides in such quantities as to make the average pay well.

The Saint Julian has been developed to some extent, and the shaft is down 125 feet. The ore continues to show the same character and grade as the Mountain Bell. These mines are all close together.

The Hudson Mining Company, of Boston, Mass, with a capital stock of $1,000,000, early in the year sent agents to the Neihart district to examine it thoroughly, and the result was the bonding of the Montana Chief for $18,000. They spent $10,000 during the summer in further development, and in September purchased it. Mr. Levi Newcomb, a mining engineer, who examined this property last April, says of it:

"The mine on which the largest force is now employed is the Montana Chief, which is on the summit of the range on the same vein as the Mountain Bell and the Saint Julian. It has one shaft 30 feet deep, with an ore body 12 feet wide, extending down to the bottom. This shaft is about 75 feet from the south end line of the claim. The shaft in which the miners are at work is 25 feet deep, and is 175 feet north from the south end line. In this shaft the ore is very rich in silver. In sinking to a depth of 20 feet it has produced ores, as per assay, to the value of about $10,000. Samples taken from a sack of 150 pounds have been assayed and found to contain a value of $8,978.20 per ton. The whole vein matter is pay ore and is 5 feet wide between the walls.

"The following claims are owned by the company: The Chief Original, the Chief No. 2, the Chief No. 4, the Caldwell and Barker, the Combination, and the First Location, making six claims, and comprising 9,000 feet in length of the great mineral zone of this camp. The Combination has cut into a vein about 9 feet. The vein is about 8 feet wide, and assays $49.25 to the ton. The Mountain Chief, No. 2 and No. 4, and the First Location assay on the croppings from $25 to $35 per ton. The following is the value of the ore on the dump at the Mountain Chief shaft:

"One sack of 150 pounds shows by assay a value of $500; 3,500 pounds assay $1,100 per ton; 8 tons assay $550 per ton; 20 tons assay $150 per ton; 15 tons assay $55 per ton; making a total value of $10,650. The company has secured by location and development the whole water right of Belt, O'Brien, and Carpenter Creeks, which have a flow of water sufficient to run one thousand stamps. The company has also located a mill site of 5 acres. There is a heavy growth of timber in the mountains near to supply the camp with fuel and timber for at least ten years. The company has also secured by location a town site, under the law of the United States."

The mine is down 100 feet and shows 9 feet of ore, all high grade. They have on the dump 500 tons of ore, worth $50,000. This same company bonded several mining prospects, and active developments are to begin at once. The company have at Townsend, the nearest station on the Northern Pacific Railroad, 200 tons of machinery for a 20-stamp mill (with power for 40 stamps) and a large concentrator, which will be transported in wagons, 100 miles to Neihart, as soon as the roads will permit. The site selected for the mill is at the junction of Carpenter Creek with Belt, probably the best site in the camp, as it is convenient not only to the Neihart mines, but also to those of Snow and Carpenter Creeks.

There are numerous other mines in this district in course of development, such as the Massachusetts, South Carolina No. 2, the Huxley, the

I. X. L., and others, the veins of which are regular in formation, an every indication points to a successful outcome of the district.

Snow Creek is about 5 miles northeast. The mines on this creek a similar in character to those of the Neihart. They are on almost direct line with the latter, and if connection is established between tl two camps by discoveries on the intervening hills it will be regarded favorable to the community of veins in depth. At present the develo ments are too limited to express an opinion as to their permanence.

New York Gulch.—In October Messrs. Merrill & Tooker, of Hele purchased the mining property at the mouth of New York Gulch, Trout Creek, consisting of Gold Bluff, Home Ticket, and Chase lod all gold-bearing, free-milling quartz, together with a 10-stamp mill wi amalgamating tables, an arrastra, and settler. The power is suppli by a 30½-inch Leffel turbine water-wheel, and the water by Trout Cre on the banks of which the mill is located. This creek contains abo 1,500 inches of water, miner's measure, and is one of the best wat powers in Montana. They commenced operation under very disco aging circumstances. The mines had been worked for simply what w in sight, and to the uninitiated looked like an immense rock quar An adit level had been run along the vein 80 feet or more, and the ve was stripped for 400 feet along the surface, showing pay ore its enti length, giving it a rough appearance. The efforts have been direct to the development of Gold Bluff. There have been two levels run a one incline. The lower No. 1 level taps the vein at a depth of 100 fe and shows good pay at the face; No. 2 level is about 30 feet, and t same quality of quartz is exposed as is seen in No. 1. The vein h been exposed in the incline, and follows it at an angle of about 60 d grees, and makes showing of a vein 3½ feet in width, with pay ore e tirely across it, which will go from $25 to $30 per ton, or an average say, $27. Work is being steadily prosecuted on this lead. The Hom Ticket and Chase, either of which equals the Gold Bluff in quantity a quality of rock, are held in abeyance for the present, as the capacity the mill is not equal to the treatment of the present output of the Go Bluff. The actual cost of working the ore at the mill does not exce $1 per ton. There are buildings belonging to the mill and mine capab of accommodating 30 men. There is plenty of timber both around t mine and mill for fuel, mining timber, and lumber.

Maiden Gulch.—During the year the Maginnis Mining Company w incorporated under the laws of Montana. The capital stock is fixed $500,000, divided into 100,000 shares. This company was organized operate the Montana and Oro Cache locations at Maiden. The form is developed by four shafts averaging a depth of 30 feet, and the ve is found to average 4 feet in width between well-defined walls. T ore carries $17 in silver and $34 in gold per ton on an average. T Oro Cache is opened by an adit level on the vein 300 feet long and winze sunk from this level 85 feet deep. The vein is 18 feet wide at t deepest point, but the average pay is about 6 feet in width and t walls are well defined. The best ore carries $67 gold and a trace silver, but the average assay of the output of the mines is $53 go and $7 silver per ton. Since 1881 about $85,000 has been expended development. During the past year works have been erected consi ing of a double oscillating Huntington mill with a capacity of from to 20 tons per day, being equal to a 10-stamp (drop stamp) mill; co centrators and amalgamators and a 50 horse-power engine. This m was only completed in December. The ore from the mine was n

worked during 1884, entire attention having been given to erecting the mill and developing the property.

The Maginnis Mining Company have recently purchased the Keystone, Kentucky, Favorite, and Comet mines, all more or less developed and all bearing gold and silver.

The Collar Mining Company met with financial distress early in the year and were compelled to shut down their works. In May the reduction company was organized at Maiden with a capital of $20,000 and a 10-ton water jacket smelter was purchased immediately.

Work on the Florence mine has been prosecuted with great success, and toward the close of the year the owners commenced shipping ore to Omaha for reduction. The ore has proved to be very rich and averaged $500 per ton when milled. Of one shipment of 140 tons made last September they cleared over all expenses $6,272.45. Other and more recent shipments exhibited even larger returns.

The Spotted Horse lead has been working its ore on the Davis arrastra during the latter part of the year. The experimental run of 23 tons yielded $787 in bullion, which was so satisfactory that the owners at once commenced the construction of another arrastra. The character of the ore is high grade and shows free gold. The development has not been pushed, but a little ore taken from where the vein crops out is remarkably rich in sulphates and ruby silver.

The Bamboo Chief, Alice, War Eagle, North Pacific, and Silver Star are all promising lodes and are generally being opened up.

Barker district is situated about 60 miles south of Fort Benton, in the Little Belt Mountains, and a few miles north of the Neihart district. Like all quartz camps its development has been comparatively slow. Capital has not come in to any great extent, and the numerous prospects of the district lie in a great measure undeveloped.

The Clendenin Mining and Smelting Company built a smelter at Barker soon after the first discoveries and before the mines had been developed to any extent. The company labored under great disadvantage from the start in the matter of securing ore. The failure of the largest stockholder caused a temporary embarrassment shortly after the smelter had been started and it was shut down until the summer, when arrangements were made with the creditors and operations were resumed with success for the remainder of the year. The smelter was idle a portion of the year after this, partly for want of coal; but, when in operation from 25,000 to 30,000 pounds of bullion are turned out weekly, which is transported by teams to Fort Benton for shipment by boat. New coal kilns have been completed, and in the future they hope to be able to keep ahead of the blast furnaces, so there may be no more stoppages on that account. A change was made in the management, and Mr. Robert Bales, a practical smelter of large experience in treating carbonate ores, put in charge. The chief difference between the ores of the Neihart and Barker districts is in the fact that the former rank as milling ores while the latter are smelting.

The Silver Belle, Wright and Edwards, and the Barker mines have had the most work done upon them, and the smelter depends chiefly upon them for its supply of ore. The Silver Belle was purchased by the smelting company for $30,000. The mine is tapped at three or four different places, and shows an immense body of high-grade carbonates. It is in splendid condition to be worked, and ore can be secured in large quantities at a comparatively small cost. There are 16 men employed, 11 of them working in the mine and carrying ore to the tramway. The output is about 25 tons per day.

The Wright and Edwards has furnished a good supply of ore for this smelter, but the Barker, Grey Eagle, and others in the immediate vicinity have been worked but little. A small smelter was erected at Barker late in the season, the cost of which did not exceed $1,200.

The May and Edna mines are the chief reliance of the company.

In the *Belt Park district*, a little west and over the range, there are some very good leads upon which the owners are hard at work. The Rainbow and Colorado mines, owned by Sellow & Hendrickson, are the best developed and have been worked by way of a tunnel to the extent of 150 feet, showing one of the richest and best defined leads in the Belt Mountains. The ore, a gray carbonate of lead, assaying about 300 ounces in silver, has been sacked and shipped to Omaha.

Birch Creek district is 15 miles west of White Sulphur Springs, and unlike the average quartz mining camp is easy of access, and has timber and water in abundance near at hand. The developments are yet too limited to admit of an unqualified opinion as to the permanence or continuity in depth, but the indications are favorable for the development of good paying mines. The ore is free milling and averages from 60 to 100 ounces in silver and a small amount in gold to the ton. There are a number of locations upon which the owners are at work; among them may be mentioned the West Virginia lode, which is 7 or 8 feet wide, and can be traced on the surface over 2,000 feet, showing every indication of being a good strong vein. The shaft is down 80 feet.

The Mineral Point (carrying $9 in gold and $65 in silver) has a 40-foot shaft, and the Bourbon and Ben Butler are also promising leads.

Cone Butte district, only a few miles from Maiden, shows large leads of rich silver rock, which have been worked a great deal this last summer. The owners are confident they have valuable claims.

The Judith Mining Company have struck a vein of ore in the development of their Silver Tip mine in this district which is 2 feet wide, bearing horn silver, a sample of which assays $450 per ton.

The Peerless mine, on which development has been prosecuted for the past two months, shows a 4-foot vein of high-grade ore, carrying bromide and black sulphates of silver. The property is developed by two shafts and a tunnel; the ore lies between porphyry and lime.

Successful prospecting is going on in the *Castle Range Mountains*. There are a number of good leads there, but only one being developed. This has a shaft down 20 feet, and shows a vein 36 inches in width from the surface that averages $50 to the ton. Messrs. Maxwell, Cameron, and others are conducting the prospecting and have erected a temporary furnace at this mine, and have run out a few small bars of bullion during the year.

The product for Meagher County for 1884 is very hard to estimate, owing to the incomplete returns received of the ore sacked and shipped to the various reduction companies in the East. However, it may be safely placed as follows:

Placer mines	$58,500
Gold from quartz	10,000
Silver	25,000
Gold and silver ore shipped	25,000
Total	118,500

MISSOULA COUNTY.

About $5,500 has been taken out of *Missoula Gulch* this season. Quartz has been found in the Bitter Root Valley, assaying from 116 to 200 ounces, but the region is difficult of access, and it is doubtful if much

can be done with the locations at present. Nothing has so far been done except to prospect, and that has been successful.

The Sweathouse district.—The Pleasant View mine, near Stevensville, has been worked to some extent. The shaft is down 170 feet and several additional levels have been run east and west from the face of the shaft. The mine is being worked by a whim. They have taken out some very good ore and have shipped two or three car-loads to Denver which averaged about $500 per ton. A seam of this rich ore tends easterly from the upper east level to the lower, ranging from 4 to 14 inches wide. There is an abundance of fine timber and water. Teams can be driven to all the dumps.

The Bitter Root Prince is a full claim trending easterly and westerly with a northerly dip. It has one shaft down 25 feet. Its croppings are about 8 inches wide, and at the bottom of the shaft the ledge-matter has expanded to 26 inches. The ore is milling but may require roasting. South of the shaft a tunnel 4 by 6 has been run in 40 feet. It is a good prospect, and the ore averages from $40 to $60 to the ton.

At the foot-hills of the Bitter Root Mountains and about 9 miles west of Stevensville is the Deep Cañon mining district, where there are many recorded locations, but the Elizabeth and Carlew alone have received any attention, and even these are comparatively undeveloped. Some new placers were discovered late in the season on a tributary of Rock Creek, about 35 miles from Missoula. The tributary is very heavily timbered and but little progress has yet been made.

The placers in Three-Mile, Nine-Mile, Cedar Creek, Quartz Creek, and Trout Creek have yielded about as well as last year, and over $6,000 was taken from Missoula Gulch.

The production of this county for 1884 is estimated at $12,000 in gold and $5,000 in silver.

SILVER BOW COUNTY,

The smallest in area of any of the counties in the Territory, exceeds all combined in the value of its mines and the amount of capital invested in them. It has for its chief mineral districts *Summit Valley* and *Independence*, the former of which includes the city of Butte, with a population of 10,000 to 12,000 and the county seat of Silver Bow County. The importance of this small district, embracing an area of mineral-bearing ground scarcely 3 miles square, in the aggregate of silver and copper production of the country at large, merits more than a brief notice. For three years, from 1864 to 1867, mining in Summit Valley district was confined exclusively to placer working along Silver Bow Creek. Some few quartz locations had been made during this period, where the city of Butte now stands, but it was some years later before the value, character, and extent of these great quartz ledges were ascertained. Their importance originally was derived from the silver properties of the ore extracted, but as capital lent aid to development, many of those mines changed in character, and as depth was attained they became distinctly silver-copper mines.

The unusually large number of new properties which have been developed the past year is a marked indication of the progress of this district. This is in part due to the increased amount of foreign capital seeking investment, but more largely to the increased and improved milling facilities afforded for treating custom ore. Of the 4,000 lode locations made in the district contiguous to Butte, the land office records show that 1,457 have already been patented, while orders for survey have been issued for many others.

The following, showing the number and capacity of the various reduction works of Butte, is from the very carefully prepared report of the commissioners from this Territory to the World's Exposition at New Orleans:

"The five concentrators and smelters of Butte daily treat ore as follows:

"Anaconda, 500 tons; Parrott, 300; Colusa, 300; Colorado, 75; Clark's Colusa, 150; Bell, 50; or an aggregate of 1,375 tons. Copper mines not connected with the reduction works produce ore daily as follows: Liquidator, 100 tons; Mountain View, 50; Ramsdale Parrott, 25; and other mines (estimated) 75; or a total of 250 tons. The silver mills are treating ore daily as follows: Alice, 90 tons; Lexington, 50; Moulton, 40; Silver Bow, 30; Dexter, 30; Old Lexington, 10; making a grand total of ore handled daily in Butte of 1,875 tons."

The placer mines which first attracted the attention of miners to this district, and which for some years were supposed to be its only source of wealth, still contribute a liberal quota to the output of the county. The length of the season here during which water is available for placer mining is ninety days. During the past year only two companies have been operating. The claims are located west and south of the city of Butte. One, the Barnard placer, is in Missoula Gulch, the other, owned by Messrs. Noyes & Upton, lies south of the city. Together they have produced the last year not less than $15,000.

The following table, showing the gold and silver production of this county for the year 1884, is derived in part from the report of mine and mill superintendents or directly from the property-owners, and in part is estimated from data gathered from such sources as are deemed trustworthy:

Source of production.	Gold.	Silver.	Total.
Alice	$125,000	$1,075,000	$1,200,000
Lexington	177,800	782,200	960,000
Moulton	54,350	666,650	721,000
Silver Bow Company	15,000	335,000	350,000
Dexter	10,000	239,000	249,000
Anaconda		750,000	750,000
Montana Copper Company		175,000	175,000
Bell		450,000	450,000
Colorado and Montana	68,000	750,000	750,000
Parrott		11,000	11,000
Clark's Colusa		160,000	160,000
Other mines, including placers		400,000	400,000
			65,000
Total	450,150	5,793,850	6,244,000

The property of the Alice Gold and Silver Company, which is situated about 1 mile north of the city of Butte, consists of the Alice, Magna Charta, Valdemere, Rooney, Hawkeye, Amy, and Highland Chief, also the Reef Fraction, Garfield, and Gusset, small claims. In addition to these a part interest in Sankie East, Sankie West, Plover East, and Plover West. The principal ore producers, however, are the Alice and the Magna Charta. The former is developed to a depth of 800 feet. The main vein varies in width from 40 to 60 feet. Ore has not been stoped below the 700-foot level. During the past year development and explorations in the Alice have been of a satisfactory character, and from Superintendent Hall it has been learned that the output for the year will reach at least $1,300,000. The developments have been without especial note, with the exception of a rich strike on the

400-foot level, but the management state that the outlook is most satisfactory. During the past summer it was deemed necessary to change the facilities for handling the water in the mine, and the purchase of a mammoth Cornish pump was decided upon. For the past few months much of the force of the mine has been engaged in placing this important adjunct to the development of the Alice properties in position, and from indications the pump will be started into operation about the 1st of February. Its capacity will be 500 gallons per minute, and it is expected that it will be able to handle all the water that may be encountered until a depth of 1,000 feet shall have been reached, sinking to which point is stated to be among the possibilities of the near future. The total cost of the new pump is estimated to be about $40,000.

West from the Alice and separated from it by the Fraction claim, is the Magna Charta, upon which is a perpendicular shaft sunk to a depth of 700 feet. The Magna Charta contains four distinct ledges, of which three are south and one is north of the shaft. Each of the four is worked on either or all the levels, and the average yield is about 65 tons per day. During the past year two important strikes have been made in the Magna Charta and have added materially to the output of the Alice Company.

West of the Magna Charta is the Valdemere, upon which a hoist was erected in 1883, and a shaft sunk, but at present the development of the mine is carried on from the levels of the Magna Charta. The company is operating two mills, one of 20 stamps and the other of 60, together constituting the largest dry-crushing silver mill in the country. The crushers, drying rooms, stamp batteries, elevators and conveyors, roasting pans, and amalgamators are all as complete in every detail as can be made. At present the mills are crushing 100 tons of ore per day (which runs from 30 to 40 ounces silver per ton, besides a small amount of gold). The property has paid thirteen dividends, aggregating $550,000, and from the present outlook bids fair still to continue paying.

The product of the Alice Company for the year 1884 is estimated to have been $1,075,000 in silver and $125,000 in gold, a total of $1,200,000.

Since the sale of the Lexington to its present owners, a French company in August, 1881, dividends to the amount of $560,000 have been paid from the earnings of the mine. Last year it produced $1,289,685.34. Its monthly yield runs now from $95,000 to $100,000. During the past year the shaft has been extended to a depth of 650 feet. At this depth the shaft is supposed to be about 250 feet from the vein. Cross-cutting is now going on on that level to tap the vein. Ore is being taken from the 200, 300, 400, and 500 foot levels, and further development has opened up ore-bodies that insure the record achieved by this property.

The Lexington vein is one of the strongest, best defined, and regular in the district. Within the past month ground has been broken for the foundation of a new air compressor, it being the purpose of the management to continue further developments with diamond drills. Three months will probably see the completion of the proposed improvements, when it is the intention to continue the shaft to the depth of 900 or 1,000 feet. The average value of the ore which has been produced by the mine for the past three years is $55 per ton, of which $45 is silver and the balance gold. The ore production is about 1,850 tons per month. The width of the pay ore averages about 3 feet, and the quartz is solid and clean, but of a refractory character, like all the silver-bearing ores in the district below water.

West of the main shaft, about 150 yards, is the Great Lexington mill.

It is fitted up with two Stedefeldt furnaces which are doing excellent work in the matter of chloridizing the ore, and contains throughout the best machinery of the latest and most improved designs. All the buildings of the company, ore-house, shaft-house, mills, and offices are solid, substantial, and enduring. The bullion output for the year has been about $950,000, of which $177,694.20 was gold and the balance silver.

The Moulton lies close to the Alice, joining it on the west. The shaft in this mine is down to a depth of 500 feet. The first, second, third, fourth, and fifth levels have each been extended 1,000 feet and frequent connections made from one to another; the ore continues good and of uniform character. The stopes have produced during the past year an average of 40 tons daily, assaying about $40 per ton. The reduction works of the Moulton Mining Company contain 40 stamps, with roasting furnace, chlorination works, and everything complete for handling 40 tons of ore per day. The bullion is uniformly .750 fine and the product for the year 1883 was $376,684.20. For the year 1884 the increase in the production has reached nearly 100 per cent., amounting to $54,348.87 gold, with 632,460 ounces of silver. During the past year three dividends have been declared, aggregating $80,000. The Moulton is a Montana corporation, having a capital stock of $2,000,000, divided into 400,000 shares of $5 each.

The Bell mine, on the same vein with the Lexington, has a three-compartment shaft sunk to a depth of 500 feet. Ore-bodies have been encountered in the drifts and cross-cuts of very high grade, with wide streaks of copper glance, and the great mass of ore extracted averages so high that it is very profitable to handle. The vein is strong and well defined, and varies in width from 6 to 23 feet. The ore carries more silver than any other copper ore in the district. Work, the latter part of the year, upon the cross-cut from the 500-foot level, tapped a vein of ore richer than any yet discovered. Cross-cutting was subsequently begun on the 400-foot level, and the same vein found as in the 500-foot cross-cut. From these two levels 80 tons of ore are hoisted daily and shipped to the Bell smelter, located in the valley, about 2 miles from Butte and a half-mile further from the mine. The ore hoisted thus far assays 60 ounces in silver and 35 per cent. copper. During the past year but one furnace has been running, and 800 tons of ore per month have been averaged. The output of the smelter for the year 1884 is estimated at $450,000, based on the product of the first ten months.

The Gagnon, one of the oldest mines in the district, which has produced over 100,000 tons of ore assaying from $40 to $100 per ton since 1876, was purchased by the Colorado Smelting Company last year. The extraction of ore was temporarily suspended and the work of sinking the main shaft to the 600-foot station begun. From the shaft, which has reached that depth, levels, at intervals of 100 feet, have been extended east and west. A cross-cut station south from the shaft tapped and intersected the ledge to the hanging wall. It exposed between regular and well-defined walls 30 feet of concentrating ore, carrying about 20 ounces of silver, 6 per cent. copper, and a heavy proportion of iron occurring as pyrites mixed with silicious gangue matter. The peculiar character of this ore renders it easy of concentration, which readily adapts it for furnace reduction. Experiments demonstrated that 5 tons can readily be reduced to 1 that would assay about 75 ounces in silver and 12 per cent. copper. Stoping has been going on in the 300, 400, and 500 foot levels.

The Original mine has the distinction of being the steadiest dividend *payer in the* Territory. Up to January 1 it had paid its thirty-second

dividend of $3,000, or $96,000 within thirty-two months immediately preceding. Its shaft is the oldest in the district, having been sunk to a depth of 90 feet in 1864. It has since attained a depth of 400 feet. On the 400-foot level, where early in the last year the ore-body appeared broken up, considerable prospecting was required, which soon disclosed an excellent quality of ore in a compact and well-defined streak, varying in width from 1 to 2 feet and sampling about $100 per ton. The same level also showed an abundance of second-class ore, assaying from $40 to $60 per ton. Further operations have been chiefly confined to the extension of the east 200-foot level and to the stopes from the winze between the 300 and 400-foot levels. The ore from this mine is shipped for reduction to the Colorado smelter.

The Margaret Ann is situated north of the Alice and south of the Glengary, and has been regarded as one of the most promising prospects on the extensive mineral belt lying immediately north of the Great Rainbow ledge, upon which are located the Alice, Moulton, Magna Charta, Valdemere, Poser, and Blue Wing mines. In July last this property came under the management of the Maryland and Montana Silver Mining Company. At this time it had been developed by a shaft 80 feet deep, from which two levels had been extended, exposing in both the east and wests drifts a fine and compact ore body, having an average width of 4 feet of pay rock, though the ledge itself is much wider. The ore heretofore extracted had been free milling, and was reduced at the Silver Bow mill, returning an average of 59 ounces to the ton. The new company has abandoned, temporarily, the old workings of the mine and has begun the construction of a two-compartment shaft. A new 15-stamp mill has lately been completed and is in operation. The mill is what is known as the dry-crushing silver mill, with Howell chloridizing furnaces.

The Josephine, Mount Moriah, Gray Rock, and La Plata are the principal mines owned by this company. During the summer, 1884, the lower workings of the Gray Rock ran into copper, and the force of men there employed was transferred to the La Plata.

On the La Plata a new shaft, 440 feet from the old one, has been sunk 800 feet deep, to connect with the 300-foot level. The ore coming from the mine is taken from the 200 and 300 foot levels. About 20 or 30 tons of 45-ounce ore is being hoisted daily. The veins of all these mines are extensive, strong, and well defined. The Silver Bow mill contains 30 stamps and one 40-inch White Howell furnace, which during the past year has done excellent work. In addition to the ore treated from the above mines this mill is largely employed in custom work. Something over 30 tons per day are treated. I estimate the value of the production of the Silver Bow mill the past year at $350,000 in gold and silver.

The Dexter mill, one of the oldest in Butte, runs 15 stamps and is a wet crusher, but has no roasting furnace. It has been a custom mill for several years and continues to be operated as such, treating about 30 tons of ore daily.

The Old Lexington mill, with 10 stamps, has also been running constantly upon custom ore.

The Colorado and Montana Smelting Company has its mill and works about 1 mile south of the city. Although the company possesses properties of its own, among them the Star West and Mountain Boy, it has been engaged for the most part upon custom work, and therefore greatly stimulated development of other properties. During the past year the capacity of the Colorado smelter and concentrator

has been increased from 50 tons daily to 75. The ore worked has come principally from the Gagnon and Nettie, though the Shonbar, Clear Grit, Self Riser, and other mines are regular contributors. The value of the silver product of the Colorado and Montana Company for the year 1884 was about $750,000.

The Poser is situated on the Rainbow ledge and has produced almost continuously during the last two years. Since January 1, 1884, about 300 tons of ore, averaging $35 per ton, have been extracted. The vein is from 12 to 40 feet in width, and though its product is generally of a low grade, a rich streak, assaying from $75 to $100 per ton, 3 feet wide, extends through the entire length of the claim. The shaft is 200 feet deep.

The Maria has its main shaft 150 feet deep, from which levels have been run and ore, valued at $65,000, extracted during the year. The pay streak is from 1 to 3 feet wide, and is regular and continuous. The silver occurs in the ore as a sulphide, and assays from $75 to $500 per ton, its average value being $150.

The Clear Grit is another mine which, originally silver producing, has developed into a great copper property. The shaft has been extended the past year to the depth of 320 feet. One of the most important strikes recorded in the district was made on the lower level, where, for a distance of several hundred feet it penetrated a vast body of low-grade copper, with occasional seams of high grade silver-copper ore, assaying in the former $300 per ton and in the latter 45 per cent. On the lower level the distance between the walls is 40 feet. The operations during the past year have been chiefly confined to exploring and opening up the mine, winzes having been sunk from the 200 to the 300 foot level for the purpose of ventilation. The owners of the property intend during the present year to erect a concentrator and smelter.

At the Wild Bill the main shaft is down 125 feet. At a depth of 70 feet the ore-body was 6 feet in width. A cross-cut was run and there a distinct streak of ore encountered. Sinking was resumed on the south side of a horse composed of talc and granite. The body of ore on the south wall was found to be 2½ feet in width, assaying 160 ounces in silver throughout the vein. Some of the assays have given as high as 900 ounces in silver. A cross-cut at 125 feet in depth shows that the horse is narrowing and that there the streaks found at 70 feet have run into one solid body of good paying ore. Work was resumed in June on the Shonbar mine. The operations have been principally on the 300-foot east drift. At a point 250 feet from the shaft, a winze, to connect with the 225-foot level, was raised. An excellent quality of ore was encountered, assaying from $55 to $70. Fifty feet further east in the drift a cross-cut is being extended north to tap a ledge lying parallel with the old one, about 50 feet distant. The ore produced is purchased by the Colorado smelter.

The Chattanooga is a fraction lode and a continuation of the Gagnon. The main shaft is down about 90 feet, another 45 feet, and one about 14 feet on a 12-foot vein of ore which assays about $19. The gold product of this ore is about $7 per ton. The property has just been leased for eighteen months, the lessees contracting to erect a new steam hoist and begin at once the sinking of a new double compartment shaft.

The Elm Orlu is east of the Poser and has its shaft down 120 feet. Much work has been done on the 55-foot level. At 55 feet the level has been run 120 feet west and 20 east. From this mine for the past year an average of 10 tons of ore per day have been taken out. The ore, a

ow grade manganese, was sold to the Colorado smelter as fast as taken ut. The vein in some places is 20 feet wide. The average pay value f the ore as it comes from the mine is about $17.50.

On the Deadwood the shaft follows the lead and is 45 feet deep. here are two veins of fair ore on the lead, which seem to be getting loser as the shaft goes down. The assays go from 20 to 180 ounces of ilver. The ore carries considerable manganese.

The Eastern lies northeast and above the Deadwood on the same ead, and is being worked on a lease. The shaft is down about 50 et, and at that depth the lessees have 2 feet of solid ore in one vein veraging from 30 to 35 ounces of silver per ton.

Three or four shafts have been sunk on the New Year lode, located elow the Bell mine, one having attained a depth of 65 feet. In the ain shaft, a 3-foot vein has been developed assaying from 90 to 275 unces of silver per ton. This valuable property has been bonded) Colorado capitalists.

Southeast of Walkerville is the Rock Island, on which the lessees ave been working night and day. The shaft is 200 feet deep, and vels have been run 30 feet each way on the lead at 125 feet. The ad at that depth is 18 feet between walls. There are in the lead three eins of paying ore, each about 3 feet wide. The daily product has een 20 tons of free silver ore assaying $100 per ton.

The Clark's Fraction mine, an east extension of the Alice, has been eveloped by a two-compartment shaft, 300 feet in depth, the ore aver- ging $40 per ton.

The Ramsdell-Parrott has a shaft 300 feet deep, and about 30 tons of re per day has been taken out from the 160 to the 240 feet levels. The ein is of copper ore, 16 feet wide, and assays 20 per cent. The ore is ut to the Bell smelter, about two-thirds passing through the concen- ator, the balance going directly to the smelter.

The Black Bear, north of the Alice, has a shaft down 100 feet. The ssees are taking out 60-ounce ore from the east level and having it illed at the Moulton.

The Blue Bird was lately sold to a California company, and is being apidly prepared for heavy work. A new house has been completed and reparations are on foot for a new hoist. The new ore-house is built vera a new double-compartment shaft, which has attained a depth of 5 feet. At 50 feet a large body of 35-ounce ore was struck. A new haft-house has been erected over the main shaft, which is down 140 eet, and a large amount of ore, assaying 35 to 55 ounces, is being taken ut of the east drift daily. The vein is 6 feet wide, and stoping is being rosecuted with vigor. Further improvements consist of a new office, ith assay-room, counting room, and sleeping apartments, furnished ith necessary modern appliances.

The Mill Site mine is leased and bonded to Hiram Rice for $25,000 or one year. The shaft is down 50 feet on a 6-inch vein of exceedingly ich ore, which gives an assay value of from 300 to 800 ounces of silver nd $25 in gold. Work and development on this mine is being vigor- usly prosecuted.

The Anaconda has continued the past year its exceedingly large roductions. The shaft, containing three compartments, has attained vertical depth of 800 feet, the intention being to sink to the 1,000-foot tation in the near future. The ledge dips south, and at intervals of 00 feet from the surface cross-cuts have been made through the vein ast and west. The ore occurs in shoots of great width and remarkable niformity as to richness. The distance between the walls, which are

regular and strongly defined, varies from 40 to 50 feet, and is filled with copper ore, except in spaces intervening between the shoots. In the upper levels of the mine a body of low-grade silver ore was discovered, but at a depth of 200 feet the character of the vein underwent a total change, and before the 300-foot level was reached the Anaconda became distinctly a copper mine of magnitude. The ore is of a sulphuret composition, and carries from $10 to $30 in silver, which occurs in a native state.

The Saint Lawrence adjoines the Anaconda on the west, and is penetrated by the Anaconda vein. It is developed by a three-compartment shaft, 669 feet deep, from which cross-cuts and levels have been extended at intervals of 100 feet. The method of development has been as thorough and systematic as that employed in opening the Anaconda, and the results have been about the same. The steam hoisting works of the Anaconda and Saint Lawrence are probably as massive as any in the world, the smooth-running machinery being powerful enough to raise ore from the 2,000-foot level. Sinking to the 1,000-foot station will soon be resumed.

The Anaconda Company has its reduction works and concentrator located at Anaconda, a new town, built the past year by this company in Deer Lodge Valley and county, about 25 miles from Butte. Only eighteen months ago there stood but a single log cabin on the present site of Anaconda. Now there is a town of 1,500 inhabitants, a majority of whom are employed in the works of the company. These works, completed the past year, are enormous in size, no money having been spared to make them the most complete in the United States. In cost they closely approximate $1,000,000. The concentrating mill is 200 by 220 feet and 75 feet high, built in steps and capable of handling 500 tons of ore per day. The system embraces really six sets operated by one power. One set consists of one stone breaker, two Cornish rollers, two sets revolving screens, four reels each, two sets of elevators, and forty-eight graded jigs. Multiply these by six and an idea may be had of the machinery, all of which is driven by three turbine water-wheels, aggregating 450 horse power. Power is communicated through the medium of a large number of 2½-inch endless ropes, passing over a V-shaped pulley. Coke and coal are delivered in bins from dump-cars running through the ore-house. The first calcining and smelting building, 490 by 150 feet in size, is a high structure supplied with furnaces covering much of the space. Another for the same purpose, 396 by 125 feet, in course of construction, will be completed in the spring, and the two will be capable of treating all the ore run through the concentrator and 100 tons of first-class ore besides. The matting-house is 60 by 220 feet, and is capable of turning out 100 tons of matte, carrying 65 or more per cent. of copper per day. To supply the works with water for safety against fire, water-tanks, holding in the aggregate 100,000 gallons, have been provided on the hill-side far above the works. A flume 8 miles long brings the wood and timber down from the mountain and deposits it 4 miles below, where it can be easily loaded on cars for transportation either to the works or to the mines at Butte. In December last Messrs. Caplice & McCune contracted with the company to supply the works with 75,000 cords of wood per annum for four years. This is doubtless the largest contract for wood ever let; it amounts to over $1,000,000, and will require a small army of men and teams to do the work. During the first quarter of the past year shipments of ore aggregating 25,000 tons were made, having a value of about 45 per cent. *copper.* Since the completion of the smelter at Anaconda, however,

shipments to the East have ceased and the product is shipped to the company's works down the valley. The new works just completed have a capacity for treating 500 tons daily.

The Colusa, the property of the Montana Copper Company, is another well known mine in this district. The average width of the ledge, as demonstrated by a series of cross-cuts, is 18 feet, all being workable ore. The producing capacity of the mine has been considerably increased during the year, 200 feet having been added to the depth of the shaft, which has three compartments and is 600 feet deep. The character of the ore has improved as depth has been attained, a greater per cent. of silver being shown. Development has also progressed on the 200, 300, and 400 feet levels for a distance of 800 to 1,000 feet each, exposing ore-shoots of great extent. The 500 and 600 feet levels are also being extended and developed. For four years the Colusa has maintained a steady production of 125 tons of ore per day. In addition to the ore from this mine, several new properties have been opened during the last twelve months for the purpose of supplying the increased demand of the reduction works. One of these claims, known as the West Colusa, has been developed to a depth of 200 feet, and at present new hoisting works are being erected. Another new property, known as the Montana Parrott, is located on Parrott Hill and has been developed to a depth of 300 feet. It is in contemplation also to at once commence the erection of new hoisting works on this claim, which shall be extensive in character and capable of treating the heavy production of ore. Heretofore the Montana Parrott has produced about 1,200 tons of ore per month, which has been treated at the company's works.

The Parrott Fraction and Company Parrott have also been largely developed.

The smelting works of the Montana Company are now recognized as among the largest in the Western Territories. Their cost has been over half a million dollars. They consist of six matting furnaces and twelve calciners, together with a number of outside bins in which coarse ore is desulphurized. The capacity of the works is 175 tons per day. A considerable portion of the ore is concentrated by jigs and Frue vanners, after which it is calcined and smelted, like the ore of a high grade. The company had, until last summer, a small concentrating plant, consisting of one Blake crusher, rolls, and jigs, with a capacity of about 50 tons, worked from 80 to 100 tons daily to supply the furnaces. In September the capacity of the plant was increased by adding more rolls, sizing screens, jigs and two Frue vanners. The vanners are used to treat the slimes which the other machines could not work, being high in copper. The ore treated pulverizes easily and is apt to go into slime form. Before the adoption of the last-mentioned machine the slimes were used direct in the smelting furnaces, but it seems that this process was not profitable, as these slimes were highly silicious and necessitated fluxes. The total production for 1883 was 9,800 tons of copper-silver ore. For the year 1884 it has produced over 165,000 ounces of silver and a very large amount of copper. The silver is estimated at $175,000, and the copper product at 8,000,000 pounds of fine copper. The copper was sent to Europe for treatment in the shape of copper matte.

Clark's Colusa has become one of the celebrated mines of this district. The shaft is down 400 feet and sinking is still in progress. At that depth the shaft is in the vein. A station has been put in and levels have been run east and west. The character of the ore found here is of a better quality and more profitable in reduction than that which is taken from the levels above. In many places the pay ore is

30 to 40 feet in width. The vein is about 50 feet wide, and the present output is nearly 150 tons per day; of this amount 20 tons is first class ore, carrying 35 to 40 per cent. copper; 30 tons second-class, carrying 24 per cent., and 100 tons third-class, carrying 15 per cent. The concentrating works recently erected consist of one crusher, two pairs of crushing rolls, double Hartz jigs, two Rettinger continuous percussion tables, and two Frue vanners. These works were constructed to concentrate low-grade ores. The ore to be concentrated contains 10 to 15 per cent. copper, and is brought from the mine above by means of an incline plane tramway, the full cars containing the ore coming down pulling the empty ones up. The ore is dumped into the ore-house which contains the crushers. The ore, after leaving the crusher, goes to a pair of slow-speed rolls; from these into an elevator, to the sizing screens of perforated sheet-iron, which supply the jigs. The ore, finer than the last screen, is sized by hydraulic sizers, the coarser of these sizers going to the slime jigs and the finer to the two Rettinger tables. The vanners are calculated to work the middlings from the tables. The product contains from 25 to 40 per cent. copper, but the loss in tailings is more than it ought to be. The concentrates have been shipped until recently to the Colorado smelter, about 2 miles southwest of Butte, but Mr. Clark is reducing them in his newly-constructed furnace, which adjoins the concentrator. The motive power of the mill is a Griffith & Wedge 40 horse-power engine, and the necessary water is furnished by a new pulsometer and by some pipes from the mine. In addition to the already complete plant, two desulphurizing furnaces are to be added. The present capacity of the concentrator is 130 tons and of the smelter 75 tons per day. The output for the year 1884 from the property is about 9,000,000 pounds of fine copper. The silver contained in the copper is estimated at $160,000.

The regularity in production of the Parrott mine the past year has in no respect diminished. The shaft has been extended to a depth of 350 feet, and the amount of ore daily taken out varies from 100 to 150 tons. From the bottom a cross-cut has been extended to the north vein along which east and west levels are now being extended. The ore body, as far as has been explored, has an average width of 8 feet. From foot to hanging wall, the ore samples about 20 per cent. copper. The south vein is of about the same dimensions, but in places is very much richer, wide streaks of copper glance occurring which carry native silver.

The Parrott Smelting Works rank among the most complete reduction plants on the continent. The buildings contain six reverberatory furnaces, twelve calciners, and concentrating machinery capable of dressing 300 tons daily. The past year has seen the reduction capacity of the company almost doubled, and when such other changes as are necessary shall have been made the plant will represent a productive capacity of 18,000,000 pounds of copper per year. The total output for the year was 14,856,323 pounds, containing 9,324,805 pounds of fine copper, the total value of which, adding the silver contained therein, was about $1,200,000. The Parrott is the only Butte company whose matte product is disposed of in the American market.

The Liquidator belongs to the group of valuable copper properties and is on an extension of the great Colusa lode, which it adjoins on the west. The claim is developed to a depth of 320 feet, with east and west drifts on the ledge at the 100, 200, and 300 foot levels, and a winze from the east 300-foot level, which has attained a depth of 20 feet. The developments in the shaft at each level disclose a continuous ledge of

e width of 25 feet between the walls, which widens at 200 feet to
, and carries in every shaft two distinct veins of very high-grade
hile the average assay from the ledge is from 18 to 20 per cent.
. The high-grade veins lay on the north and south walls of the
edge and are each about 8 feet wide with a wide streak of lower
ore between, all of which may be said to be good ore for concen-
. The drifts, cross-cuts, and stopes of the 200 and 300 foot levels
to view an immense dike of cupriferous ore of this character,
nensions of which, so far as exposed, may be roughly estimated
eet wide, 200 feet long, and 150 feet high. This magnificent ore-
ies between granite foot and hanging walls, with a strong cleav-
each side, and with from 12 to 18 inches of talc on each side. The
ing in the 200 foot level are three frames wide, and five sets of
s are required in the 300-foot level. The entire width of the
from the east 300-foot level is in good ore, while the bottom is in
of copper glance, which seems to have been made exceedingly pure
ore, and the indications all point to the improvement of this great
with further development to a greater depth. About 125 tons of
raised per day. The product goes to three different dumps, 10
shipping ore assaying 30 per cent. and upwards going to the sack-
40 tons of 25 to 30 per cent. ore to the second-grade dump, and
s to the third-grade pile, which is sold on the dump as fast as ex-
. The first-grade ore is shipped to Liverpool, and in order to
ite the shipping operations an elevator is being constructed which
ist the ore from the crusher to a large bin, from which it passes
h apertures at the bottom directly into the ore sacks, which are
about as rapidly as three men can carry them away. It is con-
ted to remodel the old Clipper 5-stamp mill and convert it into a
trator for the treatment of the Liquidator product which samples
an 20 per cent. This enterprise will render available for extrac-
vast amount of ore in the 100 and 200 foot levels of the mine and
ore than double the present output.

Mountain View is an extension of the Anaconda and Saint Law-
mines, and the Colusa, to the eastward, is on the same vein. No
n the district has been watched with keener interest by expe-
l miners than this. The shaft is 638 feet deep, having been sunk
pth of 500 feet by a winze and one horse. Very little water has
r been encountered. The claim is on the apex of what is known
naconda Hill," and it was not expected, therefore, that copper
be struck at any depth less than 300 feet; accordingly it was to
0-foot cross-cut that attention was mainly directed. The foot-
as encountered at a distance of 150 feet from the shaft, from
point it has been advanced across the vein 105 feet. Good cop-
e occurs in the 300-foot level, but it is in patches and streaks,
n resembling the Anaconda, in which, above the main copper
the copper ore occurred in pockets and streaks. On the 400-foot
cross-cuts were run and the ore-body found to be more intact.
e 500-foot level cross cuts were run to tap the north and south

On the latter vein the ore-body was found to be much improved,
in being of a width of 128 feet, the richest ore appearing on the
all. A cross-cut on this level to the north vein was run, from
drifting for a distance of 375 feet was prosecuted, the drift being
for a distance of over 275 feet, the vein having a width of 17 feet
ging about 25 per cent. On the dump are about 10,000 tons of
l and third class ore averaging from 10 to 25 per cent. in copper.

The first-class ore is all shipped and the balance reserved for future disposal.

Independence mining district lies west of the city of Butte, and is separated from it and Summit Valley district by Missoula Gulch. A greater part of the mines here being worked lie on what is called the manganese belt. Most of them could not be profitably worked a few years ago, when they were located, in consequence of a lack of facilities for working the ore and because so much of it was of a low grade. But now the smelters pay a good price for it, because they need the manganese in the reduction of other ore. Until recently the impression was general that this district was comparatively barren of mineral wealth. The error of this theory, however, has been abundantly demonstrated by the ores, rich in wire, horn, and ruby silver, and the oxides and sulphurets extracted from the Anselmo, and more recently by the development of the extensive and high-grade ore-bodies of the Orphan Girl, while the ledges, developed in the prospect holes, which dot the entire district from the Rainbow lode on the north to Silver Bow Creek on the south, indicate that pay ore exists.

Since September last a force of men have been employed in extracting ore from the Stevens mine. The task of pumping out the accumulated water was almost herculean. Three pumps were kept going constantly for several weeks. After the water was reduced to the sump in the shaft the mine was thoroughly overhauled, cleaned, and timbered where necessary. For the past three months the mine has been producing about 30 tons of ore daily, which is being worked at the Silver Bow mill. The yield of silver assays $45 per ton. The shaft is down 225 feet and levels are run 400 feet east and 350 feet west. Work is being done in the stope on the west level. The ore vein is from 18 inches to 3 feet in width, but exceedingly rich, often producing pieces lined with native and wire silver.

The Czarina is developed by a shaft 30 feet deep, from the bottom of which an east drift strikes the pay vein at a distance of 8 feet from the shaft, where it is 2 feet wide, carrying a rich pay streak 16 inches wide. The ledge is developed by an open cut on the surface, and both above and below is a well defined fissure, with granite foot and hanging walls. The ore is a very high grade, being a manganese, carrying sulphurets, chlorides, and horn silver, an average sample assaying 200 ounces.

The Red Boulder has a shaft 52 feet deep, and penetrates an ore body carrying sulphurets of silver averaging from 30 to 50 ounces. A steam engine and No. 2 Knowles pump have been placed in position and further developments are being vigorously pushed.

The Katie Morris, joining the Red Boulder on the west, is being developed. The shaft is 65 feet deep and strikes the vein in the bottom, from which very rich ore has been taken.

The Mapleton is one of the most promising prospects in this district. At a depth of 25 feet the ledge has been uncovered 6½ feet wide, showing an ore body assaying 37 ounces of silver and 16 per cent. manganese across the face.

The Geneva is being actively developed. The main shaft has attained a depth of 50 feet. The north cross-cut is in a lead of free-milling ore, assaying from 40 to 50 ounces. Another shaft, which has been sunk 120 feet northwest from the main shaft, has penetrated 5 feet of rich ore which assays as high as 250 ounces.

The Andy Johnson is worked under lease, and 40 tons of ore from the 100-foot level returned $131 per ton. A winze is now being sunk from

the 100-foot level, which is in 16 inches of very high-grade ore, assaying as high as 600 ounces and sampling 300.

The Saturn has its shaft to the depth of 30 feet on a vein 5 feet wide, wherein the pay streak varies from 6 inches to 3 feet. The ore is disposed of by the lessees to the Colorado smelter and averages 200 ounces. Levels have been run 25 feet east and west, and the shaft is being rapidly entended.

The I. X. L. lode is also operated under a lease. At the depth of 40 feet an east drift has been run which is in a 2 to 4 foot ledge, assaying from wall to wall 70 per cent. of manganese and 52 ounces of silver. The stopes of the east drift are yielding about 10 tons of ore per day, which is reduced at the Colorado smelter.

The Placer lode, joining the Saturn on the south, has a shaft 50 feet and a drift run on the ledge 50 feet westward, where an upraise has been started and considerable ore taken out, assaying from 30 to 130 ounces.

The Orphan Girl has become one of the best known ore producers in the district. The shaft is 250 feet deep. At 170 feet a level has been run about 25 feet. Cross-cutting is actively progressing from the bottom of the shaft. During the past summer and autumn this mine supplied the Dexter mill with 30 tons of free-milling ore daily, all of which was obtained from the upper part of the ledge. The pay shoot has proved to be 300 feet long and from 12 to 25 feet wide, and all of it of a workable quality. The product for the year 1884 has been 300 ounces of gold and 210,000 ounces of silver, of the value of $231,700.

The Carrie lode lies west of Butte, and has recently been bonded for one year for $50,000. The shaft has been sunk already 50 feet with very gratifying results. At the depth of 30 feet a 2-foot vein of good ore was discovered. At the depth the shaft had then reached the vein had widened to 3 feet. A drift was then started from the 50-foot level, and rich ore is being extracted daily. The average assay from several tons last extracted runs from 80 to 90 ounces of silver.

The Little Darling, 4 miles west of Butte, is under lease for one year, and also bonded to the lessees for $75,000. The shaft, down 50 feet, encountered the ore-body at 45 feet. At the bottom of the shaft the vein was opened to a width of 30 feet in the cross-cut, and the drift is being pushed west. The ore assays 90 to 130 ounces. Sinking is going on to the 300-foot station, and thorough explorations will be made.

The Champion has several shafts, the east down 65 feet and the main shaft 125 feet, and on the vein; both are well timbered. Sinking is going on in the main shaft, where the vein is widening as depth is attained. A level has been run east from the 80-foot station, and good ore found all the way. The ore extracted is free milling, and has been treated at the Moulton mill; it assays about 36 ounces in silver and several dollars in gold.

The Anglo-Saxon has its shaft down 210 feet. Below the 100-foot station the shaft is sunk on an incline, following the foot-wall and going down on the ledge. The west shaft has a depth of 100 feet. At a point 50 feet from the surface drifts east and west have been extended 75 feet each way, showing the ore shoot to have a developed length of 150 feet. Levels are being run east and west from the foot of the main shaft. The general width of the ore-vein is 10 feet. The daily average product is 30 tons. The ore is remarkably free milling, and is a mixture of decomposed porphyry and quartz, carrying chloride of silver and a little iron. The hoisting works, engine, and pumps, are in first-class shape, as is also everything connected with the mine.

The Self Rising is a fine silver manganese property, lying about 2 miles west of Butte, now under lease to Henry Olsen, who is taking out daily between 25 and 30 tons of ore, which, after treatment at the Colorado smelter, nets him about $2,000 per month.

The Mono, owned by Gassert & Riding, has its main shaft 85 feet deep, worked by a windlass. The average width of the vein is 2½ feet, carrying 20 to 50 ounces of silver and about 80 per cent. manganese. The ore has proved continuous as far as the east level has been run, a distance of 300 feet; 150 feet has been stoped, showing good ore.

The Golden Rule, also under lease, is developed by a shaft 100 feet in depth, on which further sinking is in progress. Cross-cuts are being made and east and west levels are being run. A new steam hoist has recently been put in place. The average assay exceeds 100 ounces of silver per ton.

The Anselmo property has had until recently little work done upon it. A force is engaged running a cross-cut from the main shaft south to a depth of 90 feet, for the purpose of intersecting the discovery ledge. A very considerable amount of 100-ounce silver and $15-gold rock has been taken from the west level of the mine, 95 feet from the surface. The main shaft is down 450 feet, but the mine is filled with water from the 150-foot level. Recently a streak of ore carrying a high percentage of molybdenite, a mineral not heretofore found in this district, was encountered.

CHAPTER VIII.

NEVADA.

Nevada has increased its production of the precious metals during ıe last year, reversing its retrograde movement since the exhaustion ' tlie immense ore-bodies in the bonanza mines of the Comstock. ıformation from many parts of the State indicate an increase in the tal yield of both gold and silver during the year. The deposits at e San Francisco and Carson mints and New York assay office of ırefined gold, stated to have been produced by the mines of Nevada, :re over $2,300,000, and of unrefined silver about $3,500,000. The :vada bullion refined at private refineries and afterwards deposited the mints, is estimated to have been not less than $300,000 of gold ıd about $400,000 of silver. To these amounts must be added the ıllion produced from Nevada ores which was directly exported with- ıt going to the mints. The reports of bankers who handled such ıllion show the export of at least $2,000,000 worth of Nevada silver ıat had not been deposited at any of the mints or assay offices. The anhattan Silver Mining Company alone, as appears from their annual :port, shipped directly during the year to London silver bullion of the ılue of $1,128,000.

Messrs. Wells, Fargo & Co., in their published statement, show that ıere was carried from this State during the year $1,527,859 worth of ɔld dust and bullion by express, against $1,097,595 carried the previous :ar, and that there was carried by express silver bullion of the value $5,905,304, estimated at its commercial value, against about an equal nount in the prior year. Ores and base bullion were also carried by ilroad from this State of the value of $1,455,776 which contained a ırge proportion of silver bullion.

Reports of the county assessors do not show quite as large a produc- on as in 1883; but the State comptroller at the time of furnishing the :port had received no returns from the assessors of Churchill, Ormsby, nd Douglas Counties, which, however, are but small producers. The ɔllowing statement shows the returns made by the mines to the county ssessors for the years 1883 and 1884.

Counties.	1883.		1884.	
	Quantity worked.	Value.	Quantity worked.	Value.
	Tons.		*Tons.*	
urchill	289	$1,451 99	.....	.....
ke	4,224	526,496 15	6,684	$641,304 00
meralda	20,121	898,158 93	11,755	310,855 53
reka	69,975	1,615,294 39	69,068	1,432,886 65
mboldt	7,566	101,487 97	11,289	255,800 59
der	4,121	865,682 85	3,532	672,413 67
coln	37,040	254,401 12	6,893	175,895 22
on	58,466	165,091 33	71,062	257,955 57
e	7,280	201,222 63	2,258	67,976 11
rey	128,802	1,829,194 82	197,054	2,598,861 18
ite Pine	15,361	321,323 34	10,068	174,632 35
shoe	.....	.....	18	3,093 90
Total	353,245	6,779,805 52	389,681	6,591,674 77

The mines of this once marvelously prosperous mining State frequently asked their stockholders for large advances with w to prosecute researches in hopes of finding lost or new ore-bodies. names of the mines which have levied assessments during the yea the amounts levied by each were as follows:

Names of mines.	Amount.	Names of mines.	A
Alpha Consolidated	$45,000	Grand Prize	
Andes	27,500	Hale & Norcross	
Alta Consolidated	162,000	Holmes	
Arcenta	10,000	Independence	
Belmont	25,000	Justice	
Belle Isle	35,000	Julia Consolidated	
Benton Consolidated	48,600	Lady Washington Consolidated	
Best & Belcher	216,000	Lewis Consolidated	
Bullion	25,000	Mexican	
California	136,000	Martin White	
Chollar	168,000	North Belle Isle	
Columbus Consolidated	25,000	North Gould and Curry	
Consolidated Imperial	50,000	Ophir	
Consolidated Virginia	93,000	Overman	
Consolidated California and Virginia	64,800	Potosi	
Day	105,000	Savage	
Dayton	40,000	Segregated Belcher	
Delaware	5,000	Sierra Nevada	
Eureka Consolidated	50,000	Silver Hill	
Exchequer	20,000	Scorpion	
Eldorado Consolidated	15,000	Solid Silver	
Eldorado South Consolidated	80,000	Union Consolidated	
Elko Consolidated	30,000	Utah	
Gould & Curry	162,000		

The Sierra Nevada and Union Consolidated each levied $250,00 ing the year. Four assessments became delinquent on the Calif mine and one on the Consolidated Virginia. Each of these were a rate of 20 cents a share, and each of the assessments, had all the s been assessed, would have amounted to $108,000, or in all $540 but, owing to the large amount of stock forfeited the assessments c Consolidated Virginia amounted to only $93,000 and of the Calif $34,000; so that instead of $540,000 from the above assessment amount collected was only $259,000. This is probably the larges feiture of mining stock on the Comstock. Most of the other min the Comstock collected the amounts levied.

Late in October the Consolidated Virginia and California mines consolidated under the name of the Consolidated California and ginia, with a capital of $21,600,000 in 216,000 shares, in place of a ital of $103,000,000 divided in 1,080,000 shares. The new corpor levied its first assessment of 30 cents a share on the 5th of Novem

The assessments levied during the year by all the mines of the were less than during the previous year, which is a healthful sign.

Storey County has undoubtedly called for a much larger amou money from its stockholders during the year than the value of the ion produced.

It is encouraging to know that five mines in this State have been to pay dividends to their stockholders during the year as follows:

Names of companies.	Number of dividends.	Am
Jackson	2	
Kentuck	8	
Navajo	2	
Paradise Valley	5	
Richmond Consolidated	1	
Total	18	

I have estimated the production of the State to have been: Gold, $3,500,000; silver, $5,600,000, obtained from the various counties as follows:

Counties.	Gold.	Silver.	Total.
Churchill	$10,000	$35,000	$45,000
Elko	75,000	700,000	775,000
Esmeralda	75,000	500,000	575,000
Eureka	860,000	850,000	1,710,000
Humboldt	75,000	200,000	275,000
Lander	40,000	1,350,000	1,390,000
Lincoln	30,000	180,000	210,000
Lyon	100,000	160,000	260,000
Nye	10,000	60,000	70,000
Ormsby	10,000	5,000	15,000
Storey	2,150,000	1,275,000	3,425,000
Washoe	25,000	10,000	35,000
White Pine	40,000	275,000	315,000
Total	3,500,000	5,600,000	9,100,000

I am indebted to Mr. James Crawford, the superintendent of the mint at Carson, for the annexed information.

CHURCHILL COUNTY.

There has been but little change in the mining industry of this county, and the yield of the precious metals, which is small compared with the other mineral-producing counties of the State, has not varied materially from that of the previous year. The most marked improvement has been in *Bernice district*, especially in the property of the Golden Crown Company.

I am indebted to Mr. Wallace Goodall, the owner of the Golden Crown mine, and to W. W. Hoyt, the owner of several promising claims in the same section, for much of the following information in regard to the mines of this district.

The Golden Crown is the principal mine and the one on which most development has been made and upon which work is being most actively prosecuted. The ore has become richer as greater depth has been attained. The upper tunnel is in 380 feet, the lower 390 feet. The ledge in the lower tunnel averages 18 inches in thickness and mills $100 per ton. On July 1, 1884, the company leased the Bernice 5-stamp mill and Broekner furnace, which have been operated steadily since the 15th of that month on the ore of this mine, reducing 500 tons of free-milling ore, which yielded $5 per ton. The ore was worked to 90 per cent. of its assay value, and the bullion turned out averaged .900 fine. As greater depth was attained the ledge became solid and the ore slightly base, carrying a small per cent. of arsenic and antimony which compelled roasting. The increased richness of the ore more than compensated for the additional cost. Wood and salt being cheap, the expense of roasting is not very great. The last ore worked yielded $65 in silver and a small per cent. of gold. During the year 21 men have been employed at the mine and 7 in the mill, and 500 feet of tunnel and 900 feet of inclines and upraises have been run. The lowest depth yet attained is 370 feet. A third tunnel is being run to cut the ledge at a depth of 500 feet.

The first extension north of the Golden Crown is the Hoyt claim, which shows outcroppings of a large ore-bed of the same formation, but sufficient work has not been done to demonstrate its value.

Half a mile northwest, in a belt of quartzite, lie the Silver Ridge and Wild Goose mines. In the Silver Ridge the vein has been uncovered for a distance of 1,000 feet. Three small veins have been shown, varying from 4 to 20 inches in thickness. The ground is easily worked, tunneling being done for $4 per foot. There are two tunnels 100 feet each on the vein, and some other improvements have been made. Twenty-three and a half tons of ore worked at the mill during the year yielded $2,249 and cost about $35 per ton to mill. Ore from the Silver Ridge mine has yielded $127 per ton, and 25 tons treated at the reduction works at Salt Lake yielded $75 per ton to the miners.

The Wild Goose Company are working on the same vein and have a tunnel of 300 feet on one of the veins, from above which they have stoped out 200 tons of ore. One hundred and seventy-five tons milled during the year assayed $130 per ton. The vein is explored on the surface for a distance of 700 feet, having ore all the way. Ten men have been at work opening new levels and stoping. The ores are base and require roasting. The mill is well equipped having a Broekner furnace, which treats the base ore successfully.

The Oregon is a promising claim. The mine has been stoped on the surface 1,500 feet, and an incline shaft has been sunk 75 feet, having at that depth a vein of good ore. The vein climbs the high mountain, and, like other mines, becomes base as depth is attained.

Utah, adjoining the Oregon, is on the same vein and has a tunnel 150 feet and an incline shaft from the surface 90 feet deep. The ledge in front of the tunnel is 8 inches wide.

Moonshine, on the same belt, has good ore, but only assessment work has been done during the year.

The Great Western, Alta, and Lime Ridge, adjoining claims, have been prospected to some extent. Quite a number of other claims have been worked with good results, among which may be mentioned the Big Chief. There are two or three claims in this district which carry ore rich in antimony.

Adjoining this district, about 8 miles south, lies *Granite district.* West Point, lying at the base of Mount Acro, has a tunnel run 55 feet on a vein which shows 3 feet in thickness.

The Silver Wave has an incline shaft 55 feet deep on a 15-inch vein.

Marshfield, in this district, is also a good claim.

Cottonwood district.—This district has attracted the attention of mining men the last year or so on account of the valuable deposits of nickel and cobalt found in it. From it some $19,000 worth of nickel ore was shipped to Swansea, Wales, during 1884. These ores are refractory, owing to their combination with arsenic. The ore is principally an impure arseniate of nickel and cobalt, and averages, as roughly sorted for shipment, 21 per cent. nickel and cobalt; but by careful selection a result of 39 per cent. is obtainable. The ore lies in chimney-like deposits, and is always to be found in the richest quantities at the intersection of cross-ledges. Nickel sulphurets have also been discovered, but they do not average over 80 per cent., though easy ore to treat.

The principal mines of the district are the British Queen and Monarch, owned by the Humboldt Nickel and Copper Company. The character of the ore is arseniate of nickel carrying very little cobalt. The Emperor mine is an immense deposit of rich cobalt and nickel. The Empire contains a large ledge of high-grade bloom and green arseniate of nickel. There are other good mines but it is difficult to secure the capital requisite to develop them. This district is located about 40 miles south of the nearest point on the railroad.

Desert district.—The Empire and Equitable mines started up during the last week in December, 1884, after having been idle during the rest of the year. They are fairly prospected, with considerable good ore in sight, and will, doubtless, pay well. The mill is now running successfully.

Antelope district.—The Eagle mine produced during 1884, 51.75 ounces of gold and 1,642 ounces of silver. A tunnel is now being run to strike the vein 360 feet below the surface.

I. X. L. district.—The Black Prince ledge is about 300 feet wide with a granite foot-wall. At a depth of about 100 feet black shale was encountered; after cross-cutting, 12 feet of ore was found averaging, per ton, 65 ounces in silver, $12 in gold, and 30 per cent. lead.

The Baywater mine, on the same lead, was cross-cut at a depth of 200 feet. The result was an average assay of 160 ounces silver per ton and 10 per cent. lead.

Table Mountain district.—But little prospecting has been done in this district during the past year.

On the President and Empire mines, Emperor ledge, a small force of men has been employed and a shaft has been sunk to a depth of 60 feet in the President and 40 feet in the Empire; at this depth a vein of ore was encountered which promises well. Sixty tons of ore were taken out and shipped to Liverpool which yielded 12 per cent. nickel, 10 per cent. cobalt, and 26 per cent. arsenic.

DOUGLAS COUNTY.

This county has never been much of a producer of the precious metals, but of late years hopes have been entertained that it would come to the front as a bullion producer which have failed of realization. The result of last year's operations was only $2,773.42 in gold and $62.20 in silver. The existence of gold mines of great richness in Douglas County has been proven beyond question. Capital sufficient to properly work them has been wanting. The temporarily discouraging results which have marked the operations on the Comstock during the past year or two have naturally affected the whole mining industry of the State.

Silver Glance district.—Marshall Willard has completed a tunnel several hundred feet to his ledge and has started up his water-power mill. He has been engaged about two years and a half in developing his mine, making the proceeds thereof pay all the expenses of the development. The ledge is a gold one, not large, being about 22 inches wide at the surface and increasing in width as it is sunk upon. It mills from $22 upwards to the ton. Work is being prosecuted some 400 feet from where ore was first struck. Other mines are being worked in the district, five different companies being actively employed. The Ventura mine, located here, has a mill running. The Franklin is also being developed. Some of the lodes in the district are 30 feet in width, and occasionally very rich streaks of black sulphuret ore are found in them. In these large lodes silver is the predominating metal.

The foreman of the Ventura mine says that he had crossed the ledge with the tunnel and found it to be 6 feet in width, from which free gold can be had at any point in the ledge with a horn. He thinks the ore will mill $50 per ton. The mine is situated about 30 miles southeast of Genoa.

Red Cañon district.—The Golden Belt mine, owned by A. S. Williams and John McKnight, has been worked since last spring, with promising developments; recently 100 pounds of specimens were taken out, valued

at $1,500. The rock that was brought out was full of free gold, which could be broken from the quartz in small chunks. The district is in its infancy, so far as prospecting is concerned.

ELKO COUNTY.

Railroad district is 28 miles southeast of the town of Elko, and the ores carry silver, galena, and copper. The only mines from which ore has been taken are the Elko Consolidated and Last-Chance. The ore was shipped to Salt Lake for reduction.

Bruneau district.—A vein of very rich ore, averaging $500 per ton in silver, was discovered in the Lady Anna mine. An incline was sunk 32 feet on the ledge. The vein, which at the surface was only 18 inches in width, had at the bottom widened to fully 4 feet and carried ore the entire width, averaging $100 per ton.

Columbia district.—Prominent among the mines of this district is the Polaris; where active operations are being prosecuted. A new whim has been erected, and is working satisfactorily. A new track has been laid to the bottom of the incline, which is down 130 feet. Sinking and drifting, both in ore, are going on. The ledge in the face of the drift at the 100-foot level is fully 6 feet in width, and will average $60 per ton.

Considerable work has also been done on the Maggie, from which some fine ore has been taken, and upon the Golden Eagle, on which a force of men has been employed.

Good Hope district.—Considerable work has been done on the mines in this district during the past year, and many tons of good paying ore have been taken out and worked. The principal mines are the Ohio Consolidated, the Big Muddy, Patience, and Golden Era.

Hicks district.—Some very fair ore has been shipped to Salt Lake from this district during the past year which averaged 100 ounces in silver to the ton.

Tuscarora district.—The mines in this district have been actively worked during the past year. The Grand Prize has been worked between the 200 and 400 foot levels. The ground above this point is unexplored; the indications are, however, that the ledge extends up through this ground to the surface. After the destruction of the hoisting works in 1883, the shaft, which had been sunk to a depth of 780 feet, filled with water to within 35 feet of the 400-foot level, at which point it appears to have found an outlet. The yield of ore has been about 15 tons per day, averaging about $1.75 per ton. The ledge formerly worked is understood to be an east and west vein, while the workings of late have been upon a north and south ledge.

The Navajo is at present the leading mine of the district. The superintendent's report for the year ending August 12, 1884, shows that the mill run covered a period of two hundred and twenty-seven and one-half days, and that there were milled 2,243 tons of Navajo ore and 121 tons of custom ore. The average battery pulp assay of the ore from the Navajo mine was $104.03 per ton, and it was worked to nearly 92 per cent. of the battery assay. Custom ore averaged $122.81 per ton and was worked to 91 per cent. The character of the ore milled during the past year was such that so large a quantity could not be crushed per stamp, nor could it be worked to quite so high a percentage as that milled the year previous. At the commencement of the fiscal year just ended, the mill was undergoing repairs and improvements, necessitated by the long run made the year previous. These were completed and *milling* resumed in November. Since that time the mill has been kept

in a good state of repair and its present condition guarantees the usually excellent results that have been realized in the past. The improvements have consisted in the placement of a No. 7 Burleigh compressor, two large boilers, additional buildings for boilers, store-room, change-room, &c. In the machine-shop there have been added an 18-foot lathe, drill-press and many other necessary things. A permanent fire apparatus has been completed, with fire-plugs in and outside of the buildings, with hose and nozzle attached for instant use. A 20,000-gallon tank has been built, and pipe, laid for supplying the mill with water. At the time of rendering the last annual report, a pump station was being cut at the south end of the shaft at the depth of 650 feet. On completing the same the old column, pipes, &c., were removed from the shaft and replaced by new ones of greater strength. A 20-inch Cope & Maxwell pump was placed at this point and found to be of sufficient capacity to handle any probable flow of water that may be found on this level. Any danger of being flooded by an accident has been guarded against by a relief line of pumps, one stationed at this level and one at the 350-foot level. In this respect the mine is well equipped for all emergencies. A large working station was opened at the 650-foot level, on both sides of the shaft. A cross-cut was extended west, and at the distance of 30 feet passed out of the black porphyry, which is the formation of the better part of the east half of the mine, and entered the blue porphyry formation, in which the west vein is found; and at the distance of 70 feet crossed the west vein, which shows a width of about 4 feet. Assays of from $5 to $20 were obtained at this point. To the east the cross-cut was extended 225 feet, and in all that distance the same formation was found as in the corresponding levels above, the only material change being that the ground was more open and of a better character. Assays of $200 and more have been obtained from stringers near the face. As no cross-cuts have been extended to the east of the 450-foot level, all work at this point has been on the west vein. The drift north has been advanced to the Belle Isle line. From this level the bulk of the ore milled the past year was extracted, and it is not yet exhausted. The principal exploiting on the 350-foot level has been the driving of large drifts and openings in the foot-wall of the west vein into the country rock parallel with the ore-body that was discovered on this vein. On the 250-foot level the ore-body on the west vein is virtually exhausted. No cross-cuts have yet been extended into the foot-wall to determine if the mineralization exists at this point. The openings below will eventually reach this level and determine the fact. On the east lateral vein, on this level, a large portion of the ore has been held in reserve, and the stopers have just commenced work at the north and south ends of the ore-chute, which is 250 feet long. The ground remaining to be stoped will yield a good quantity and grade of ore.

The new work on this level has been principally directed to developing the ore-body on the new vein. The work consists of a cross-cut extending from the drift south on the east lateral, at a point 85 feet south of the Navajo and Belle Isle line. A drift has been extended north from this cross-cut a distance of 85 feet to the north line. At this point a joint line upraise is being carried upon the vein to the 150-foot level. The vein is of fair size and the ore of high grade and promises to extend a considerable distance north. South of the cross-cut the drift has been advanced 163 feet, making a total length of 248 feet of the vein developed south of the Belle Isle line. South of the cross-cut 15 feet

an upraise has been carried up 60 feet and connected with a winze sunk from No. 1 cross-cut on the 150-foot level. The south drift is being pushed ahead as rapidly as possible and is still in high-grade ore. The production of the mine for the year was $268,006, of which two dividends of $25,000 each were paid the stockholders.

The Independence, under the same management as the Navajo, has had shaft No. 1, at the south end of the mine, sunk an additional 100 feet, besides a great deal of other work in the way of exploration. The shaft followed the vein all the way down, showing a fair width of milling ore. Perhaps the most important disclosure made during the past year is the discovery of an east and west vein of good average size, the ore at first being somewhat irregular in grade, but growing richer as the work progressed.

The present prospecting work in the Belle Isle mine proper is developing some good ore, and its future outlook is thought to be flattering.

The workings during the past year have reached the depth of 450 feet. On the 350-foot level drifts, cross cuts, winzes, and upraises were driven to the amount of 1,567 feet. In both Nos. 2 and 3 drifts good ore was encountered. The most encouraging developments made the past year have been on the 250 and 150 foot levels, on a vein that has not been reached on the lower levels. At the south line on the 250-foot level a joint Belle Isle and Navajo cross-cut was driven east of what is known as the "east vein." No drifting has been done at this point, but an upraise has been carried up on the vein 78 feet, and in this distance a fair-sized vein has been developed, and the ore will average between $100 and $200 per ton. On the 150-foot level a cross-cut reached the vein at a distance of 55 feet. At this point the ore showed a width of 3 feet. A drift is being driven north, and has gained a distance of 40 feet.

The North Belle Isle is reported to have encountered another ore-body that promises a good output.

The Tuscarora is favored with a good foundry, with appliances for making castings for all kinds of milling, mining, and agricultural purposes up to 5,000 pounds.

Work on the Argenta has been carried on principally on the 400-foot level, and some trouble has been encountered from water.

Considerable new ground has been opened up in the Elko Consolidated mine; the mine has produced some very good ore.

Many other mines in the district upon which work has been done during the year give promise of becoming valuable properties.

Sprucemont district.—This camp, after lying dormant for a number of years, is again coming to the front as a bullion producer. A large body of chloride ore has been uncovered containing hardly enough lead to smelt it. A 30-ton smelter has been completed.

The assessor's returns for Elko County show the production of the mines during 1884 to have been as follows:

Name of mine.	Tons.	Value.
Grand Prize	1,970	$149,652 47
Navajo	4,383	464,909 65
Elko	331	26,741 88
Total yield	6,684	641,304 20

ESMERALDA COUNTY.

t Cory district.—The principal mine in this district is the Mount
report of the operations of which has been kindly furnished me
Albert Arents, the superintendent:
vein has a strike of southwest, 59° northeast, and is from 10 to
wide; the gangue is a decomposed feldspathic quartzy material;
ak 3 feet wide, lead, zinc, copper, and iron sulphides being the
l silver-bearing minerals. The mine is opened by five tunnels,
m 150 to 1,500 feet long, which are connected by proper winzes
aises; numerous cross-cuts pierce the vein at right angles to its
a depth of 500 feet has been attained. The production of the
s been 186.57 ounces gold, and 274,623.40 ounces silver, sent to
refinery at San Francisco. Fifty-five men have been employed
nine and thirty-five at the mill.
mill was completed about April 1, 1884, and has been in success-
ation up to the present time, and is one of the most complete
the State, the reducing capacity being 72 tons per day. The
of reduction is called 'Patera's process,' after Mr. Patera, who
lied it in Austria. Its fundamental principle is that hyposul-
f soda, a certain alkaline salt (not found in nature, however),
solution and coming in contact with chloride of silver, will dis-
, and that the silver may be precipitated out of this solution
y sulphureted hydrogen or sulphureted metals which dissolve
r leaving the liquor, that is, the hyposulphite solution, as it
ginally. In other words, the hyposulphite solution is regen-
and may thus be used again and again.
re are then used two kinds of solution; one for dissolving the sil-
of the ore, the hyposulphite solution mentioned before, and one to
ate the silver out of this first solution, the polisulphide of calcium.
hur unites with the silver in the former solution, and the silver
precipitated as sulphide of silver. When the sulphide of silver
tled it is run into a centrifugal machine, making five hundred
ions per minute. The water passes out of the machine, leaving
hide of silver tolerably dry and lumpy. The rest of the water
superfluous sulphur are driven off by heating it in a small re-
tory furnace. After this drying and desulphuration, the mate-
melted into bars in black-lead crucibles.
re is one Blake crusher, four Stedefeldt shelf dry-kilns for drying
l one for drying salt; they all give entire satisfaction. There
e sets of Krom's steel rolls having a crushing capacity of 72 tons
with proper treatment and when run full time. There are two
and two single Krom revolving screens. There are three link-
l two rubber-belt elevators and two conveyor screws. There are
volving furnaces, invented by Albert Arents, the superintend-
he mine and mill. Their peculiarity is that they are not cylin-
ch being a frustum of a cone revolving around a horizontal axis.
re are twenty-four leaching vats of 11 feet diameter and 3 feet
here are three copper, five lead, and six silver precipitating
here is a set (2) of sulphite of calcium cooking tanks. All of
nks can hold 3,000 gallons of liquids. There are two collection
ee storage tanks, and two more tanks located in the centrifugal
atch the liquor as it leaves the two centrifugals for drying the
precipitates mentioned. One of these machines is used for
ulphides only, and one for lead and copper precipitates, as the
1 may require. There are two centrifugals already mentioned

and two steam-pumps for elevating the liquors when run down by gravity. There are four steam-engines in this mill. One drives the crushing machinery and their appurtenances, one drives the roasting furnaces, one the Blake crusher, and one the centrifugals. Four boilers, two at a time, supply the steam."

Considerable work has been done on the North Star, and a ledge of very fair ore has been uncovered, which promises to become a valuable property.

A number of other claims in the district have been prospected, but no permanent improvements or developments have been made.

Esmeralda district.—A number of men have been engaged in working on the mines during the year, the yield of bullion being about equal to that of 1883, taken principally from the Juniata, Silver Lining, and Humboldt West mines, on each of which a force of men has been employed a portion of the year.

On the Antelope, owned by Messrs. Seawell & Newton, a number of men have been employed in opening up the ledge on the 400-foot level, where it shows a width of 6 feet, 3 feet of it being very good ore.

On the Cortez, Esmeralda, Sabina, Centennial, Grand Trunk, Finney, Thanksgiving, and a number of other mines, nothing more than assessment work was done, some of them showing good ore, particularly the Esmeralda, Grand Trunk, and Sabina.

The ore of this district is free milling, carrying about 80 per cent. gold and 20 per cent. silver per ton. The high cost of reduction is a great drawback to the success of the camp, everything required in mining and milling, except wood, having to be transported by teams from Carson City or Hawthorne, the nearest points on the line of the railroad.

Columbus district.—The bullion product of this district for the past year has been light in comparison with former years, which is to some extent due to the litigation between the Holmes and Northern Belle companies. The property of the latter, consisting of the mine and hoisting works at Candelaria, the mills and personal property at Belleville, was sold by the United States marshal on March 20, 1884, the Holmes Company becoming the purchaser. The Northern Belle Company having under the law six months in which to redeem the real property, nothing was done on either mills or mine until about October 1, at which time the Holmes Company obtained the marshal's deed to the property, and a small force of men were set to work making repairs in the various workings of the mine. As soon as the repairs were completed the force of workmen was increased, and prospecting on the various levels in the mine and the extraction of ore has been vigorously pushed. The mills have not been started up, but it is expected that they will commence reducing ore on the 1st of February, 1885.

The Holmes, adjoining the Northern Belle, is under the same management, and under the superintendency of Mr. James Cross has been thoroughly opened up, and the extraction of ore will be commenced as soon as the mills have been repaired.

The Mount Diablo mine has had the usual force of men employed during the year, mainly in prospecting and opening up new ground. The workings have attained a depth of 840 feet, the workings being 100 feet of vertical shaft and 740 feet of incline, at an angle or dip of 48°. A little more than 2 miles of drifts and winzes have been run on the various levels during the year, and a great deal of good milling ore has been exposed, ready to be extracted as soon as the milling facilities can be obtained. Heretofore the ore has been reduced at the mills of the

Northern Belle Company, and a proposition of the Holmes Company to reduce their ores has been accepted. The receipts from bullion during the year were $116,372.66, of which over $86,000 was spent for labor and $13,000 for milling.

A great deal of work has been done on the Columbus Consolidated during the year, the mine having been thoroughly explored to a depth of 300 feet, and a large quantity of ore exposed. Much of the ore contains black manganese, and averages in value from $35 to $60 per ton. The company has also placed substantial steam-hoisting works on the mine. Late in the season work was suspended, owing to litigation with adjoining claims.

A tunnel has been run 800 feet on the Enterprise, which at a distance of 500 feet encountered an ore-body 42 feet wide, averaging $25 per ton.

A small force of men have been working the Biszan mine, and have taken out some rich ore, which was sent to San Francisco for reduction.

A number of very promising mines in the eastern portion of the district have been prospected and show good ore.

The Tilden mine shows a ledge of good milling ore, but the mine cannot be worked to advantage for lack of pumping machinery.

Santa Fé district.—A great deal of prospecting has been done during the year in this district. Many of the mines show good ore, but lack of milling facilities has tended to retard their development.

On the Tip Top a number of men have been engaged opening up the ledge to a depth of 350 feet. The ledge is about 4½ feet wide, and the ore averages about $100 per ton in silver, with a slight percentage of galena.

The Wall Street shows a vein nearly 6 feet wide, opened up by a tunnel 150 feet in length and a shaft about 60 feet deep.

The Black is the extension of the Wall Street and shows a ledge about 3 feet wide, which has been opened to a depth of 60 feet with a tunnel and shaft.

On the Copper King the vein is nearly 20 feet in width. A shaft has been sunk to a depth of 100 feet. Some 200 feet of drifts have been run from the bottom of the shaft upon the ledge. The ore carries a large percentage of copper and averages $60 per ton in silver.

In the Sunrise a large body of ore was opened up, averaging $125 per ton in silver; a streak about 15 inches in width assays from $500 to $800 per ton; specimens taken from this streak show native silver.

Work has also been carried on to some extent on the Esmeralda, Sweet Vengeance, Illinois, Gladding, Fresco Belle, American Eagle, Stone Cabin, Lucky Baldwin, and Rumford mines.

Silver Star district lies south of Luning, on the line of the Carson and Colorado Railroad. There are some very promising mines in the district, among which are the Narrow Gauge, Valley View, Esmeralda, Infant, and Lime Point. Quite a number of men have been prospecting these and other mines in the district during the year, but no improvements of any importance have been made upon any of them.

Gillis Mountain district is situated about 8 miles southeast of Luning. Upon the Hidden Treasure, the principal mine, a force of 15 to 20 men have been at work. The ore is shipped to San Francisco for reduction. The vein is 5 feet in width, and the ore is sorted before shipment to an average value of about $500 per ton. No great amount of work has been done upon any of the other mines in the district.

Garfield district.—There has been considerable prospecting done in this district during the year, and a number of very promising claims

have been opened up. Owing to lack of milling facilities the bullion output has been confined to the mines owned by Farrington Brothers, the Great Western being the principal one, the bullion yield of which has been large. During the past summer a 5-stamp mill was erected within 2½ miles of the mine by the Messrs. Farrington, which, since its completion, has been kept in constant operation on ore from this mine. Before the completion of the mill the ore was shipped to San Francisco and Belleville for reduction.

Lake district.—Some valuable discoveries have been made in this district during the year.

Mr. Joshua Moss has erected a 5-stamp mill, and the camp gives promise of becoming a steady bullion producer. The veins are narrow, but many of them carry free gold.

Pine Grove district.—The Wheeler and Wilson mines have been worked during the year with favorable results. On the Wilson mine a great deal of new ground has been opened.

In the Wheeler mine explorations have been carried on vigorously, and a considerable amount of good ore has been exposed. The product of the mine for the year was $2,955.

Lida Valley district.—The only work of any note done in this district during the year was on the Fortunatus, from which 200 tons of ore have been taken averaging $30 per ton. The improvements on the mine are a shaft 280 feet in depth, drifts run from which on the vein have opened up four ore chimneys. The vein belt, said to be nearly 300 feet wide, is composed of talcose slate and quartzite, in which occur these ore chimneys. The predominating metal is gold with a slight percentage of silver and galena. The ore is worked in two steam arrastras, 5 miles from the mines, erected during the past year at a cost of $5,000.

Silver Peak district.—Mr. John Cheatovich, lessee of the Vanderbilt mine, has had a force of men employed in working the mine. The value of the bullion taken out during the year was $7,142.50.

Alum Creek district.—Several men have been prospecting in this district for the past two years, and a number of promising claims have been partially developed. No improvements of a permanent character have been made, however, though some of the claims show sufficient ore to warrant a more vigorous prosecution. The ledges range from 1 to 5 feet in width, and are principally gold, though in some a slight percentage of silver is to be found.

Gold Mountain district.—But few men have been employed on the mines of this district for the past year. Three men have been engaged in extracting from the Wide West, the vein varying from 4 to 12 inches in width, and assaying $30 per ton in gold, and is worked in steam arrastras.

No work of any account has been done on the State Line mines, nor upon the claims owned by the Oriental and Miller Company.

The assessor's returns show the product of the mines which have made reports in this county to have been during the year:

Name of mine.	Tons.	Value.
Mount Cory	7,856	$199,847 65
Nevada M. and C. Company	3,343	83,072 65
Great Western	556	27,936 43
Total yield	11,755	310,855 53

EUREKA COUNTY.

Eureka district embraces a broken mountainous region, standing alone except when connected by narrow ranges with the Pinon and Diamond Mountains. To the north extends, for 40 miles, Diamond Valley, a depression covered in winter by water, and during the greater part of the year presenting a hard floor, strongly impregnated with salt. To the south lies the broad basin of Fish Creek Valley connecting with Newark Valley on the east, while Antelope Valley extends on the west to the neighboring mountains. This region is characterized by broad, shallow basins, long, narrow ravines and winding valleys, above the base of which rise many prominent peaks—Diamond Peak in the northeast corner of the district being the highest, measuring over 10,000 feet above sea level.

So great has been the demand for wood and charcoal in the reduction of lead ores that the mountains have been stripped of trees. The first mining location was made at New York Cañon in 1864, the property being known as the Eureka mines. Although it never fulfilled the expectation of its owners, it gave name to the district and county, and finally to the neighboring mountains.

In 1869 important discoveries were made on Ruby Hill, which have been successfully mined and render this section probably the most successful mining district in the State. Work upon the numerous mines has been prosecuted vigorously during the year, the ore taken out being reduced at the works in Eureka, principally at those of the Eureka Consolidated. The annual report of the Eureka Consolidated shows that during the past year 14,144.3 tons of ore have been worked at the company's furnaces, yielding 1,397.3 tons of bullion, gross value in gold and silver of $484,420.94. Of the ore reduced 3,295 tons were custom ore. At the mine 3,670 feet of drifts have been run and about 2,205 feet of raises and winzes. About 60 men have been at work in the mine upon the tribute system. No important developments have been made during the year, but sufficient ore has been mined, with the custom ore purchased, to keep one furnace running.

About the 1st of September a good body of ore was opened from what is known as the Sentinel cut, 50 feet below the surface. This now shows a body of high-grade ore 8 feet in width, running into unprospected ground. The other bodies being worked show no particular change. The yield of the mine and the ore prospects are as good as at any time during the past year. Extensive experiments were made during the year upon working the speiss, of which there is in the furnace dump about 50,000 tons, of an average estimated value of $20 per ton.

The receipts for bullion were—

26,829 bars, 2,946,942 pounds base bullion	$543,221 57
299 bars base bullion from speiss, 32,536 pounds	2,521 31
10 bars refined bullion, 5,561 ounces	8,489 66
From assessments Nos. 6 and 7	100,000 00
From sales of ore by superintendent	2,604 81
Total	656,837 35

Late in the season the company commenced the erection of a new furnace and numerous other changes and improvements in and about their reduction works. The site, 35 by 40 feet, for a new water-jacket furnace is being excavated immediately west of the trestle-work in the side of the hill, some 24 feet above where the old smelters stood. The

furnace will be 7½ feet long by 3½ feet wide, and will have a daily working capacity of 60 tons.

In the Richmond Consolidated mine several new and important ore-bodies have been opened, the third and fourth levels showing up particularly fine bodies of high-grade ore. This mine at present looks better than it has at any time within the past three years. A great deal of new ground has been explored, and the result has been beyond the most sanguine expectations of the management. The furnaces and reduction works have been kept in almost constant operation for the past twelve months, and a large amount of custom ore has been worked.

A new speiss furnace has been added to the works, and has been in constant operation since its completion, early in the year, giving very satisfactory results. The value of the ore per ton extracted has exceeded that of the ore extracted in 1883, the average assay for the present year being $56.91 against $49.93 for 1883. The yield per ton for the present year has been $52.73 as against $44.19 for 1883. The expenses of mining have increased from $13.01 in 1883 to $15.83, mainly due to depth attained and increased distance from main hoisting works. The smelting expenses per ton are about the same, $11.72 for the present year as against $11.66. The yield of bullion for the present year has been, gold, 19,619.28 ounces; silver, 524,367.99 ounces; lead, 5,171,402 pounds. This mine paid one dividend during the year amounting to $67,500. Up to November 1, 1884, the mine has produced and paid $4,079,886 in dividends.

There are at the present time a larger number of men employed at the Richmond reduction works than have been employed at any one time for the last three years. A large portion of these men are engaged in working on the large slag-pile at that place, and there is slag enough there to keep the present force at work for the next three years. In order, however, to work this slag flux must be secured, and this flux will be taken out of the mines in our district that have tens of thousands of tons of low-grade ore in sight, which ore is exactly the article needed for fluxing purposes.

Explorations have been carried on upon the property of the Eureka Tunnel and Mining Company with favorable results. A considerable quantity of ore has been mined and reduced at the works of the Eureka Consolidated. Owing to financial difficulties early in the year the property was taken by a syndicate of the creditors reincorporated under the name of the Eureka Tunnel and Mining Consolidated Company. This company has since its incorporation had a force of men employed in prospecting and opening up the mine, which gives promise of becoming one of the most valuable in the district. The ore is a yellow chloride, much of it averaging $100 per ton in silver, and has been traced to a depth of 250 feet below the tunnel level. The ore extracted has contributed largely to pay the expense of working the mine under the new management.

In the Albion mine a rich body of ore was discovered early in the year. The usual force of men have been employed in extracting and prospecting.

The Alexandria mine is situated on Prospect Mountain, some 600 feet south of the Eureka Tunnel and about 600 feet from its adit. Near the summit of the mountain the ledge of limestone is somewhat over 500 feet in width and lies between the two beds of shale exposed in the tunnel. The Alexandria company own some 1,500 feet of this, along its course, by 600 feet in width, the title to which is principally secured *by United* States patents. This new shaft is some 300 feet southeast

of the old works, and the principal operations of the company are being conducted here. The shaft is a double-compartment one, well timbered for a distance of 320 feet. A 30-horse-power engine hoists the cages and loaded cars. The third level has been run across the shale and foot-wall over 100 feet and is just entering the ledge. A stream of water was encountered in the drift, or rather cross-cut, which furnishes the mine with all the water required for hoisting purposes. At the 200-foot level a cross-cut runs south 130 feet to explore the bottom of a large cave discovered on the level above. The cave is about 50 feet in diameter, the bottom being filled with iron and ore. A winze sunk 50 feet was in pay ore all the way down. Ore in considerable quantities has been shipped and reduced at Eureka during the year.

The Silver Connor mine has been shipping ore almost daily, and is turning out to be a very valuable property.

The Hamburg mine has been worked by tributers under lease and has paid both tributers and owners handsomely.

Prospecting has been carried on upon the Ruby and Dunderberg. The ore is low grade, paying little more than the actual cost of mining and reduction.

A large number of producing mines have been worked in the district during the year, the ore being worked at the Richmond and Eureka Consolidated Company's smelters. Among them are the Hoosac, Western Globe, General Lee, Smith & Saugunett, Irish Ambassador, Rescue, Maria, Silver Lick, Ozark, Lord Byron, Scorpion, Altoona, Last Chance, Bay State, Jackson, Members, Reserve, Marguerette, Hillside, Joe McGown, Malone, Esmeralda, Dewitt, Gilmore, Gore, X. Y. Z., Kit Carson, Alexandria, Five Twenty, Idaho, Phoenix, Eureka Stone, Liberty, Dead Broke, Oriental and Belmont, East Oakland, Dugout, State Reef, Home Ticket, Banner, and Eureka Star.

Mineral Hill district.—Very little work of any note has been done in this district since February. The Christie Mining Company closed down their mill at that time after making a short run on tailings, from which they netted about $8,000. The company has a large quantity of tailings near their mill, estimated to be about 20,000 tons, assaying on an average $16 per ton. It is proposed to erect leaching works to work these tailings in connection with the low-grade ore in their mine, which assays about $30 per ton.

The Hartford mine has produced some very rich ore, which nets the owners from $200 to $350 per ton. This mine shows up a better quality of ore than any other mine in the camp.

The Swallow and Poor Boy mines have both well defined veins of low-grade ore; the veins vary from 2 feet to 6 feet in width; the ore is of a similar character to that found in the Christie mine, assaying about $30 per ton, and is shipped to Palisade for reduction.

Messrs. Buchanan & Goodhue have had 3 men employed in opening the Bell mine. About $5,000 worth of work has been done making open cuts and incline shafts. The ore is free-milling quartz, averaging $120 per ton. Six tons of the ore worked at Palisade gave returns of gold $100, silver $616.

Schroeder district.—I am indebted to Mr. Benjamin W. Goodhue for much of the information relating to this camp. The district was discovered in July, 1883, and is situated in Eureka County, about 10 miles northwest of Carlin, on the Tuscarora road. Active work was not commenced on any of the claims until 1884. Already considerable work has been done and many valuable discoveries made. All the mines upon which any work has been done thus far show the same char-

acter of ore, viz, a chloride of lead and antimony, and only differing in the quantity of gold and silver which they contain.

The formation of the district is lime belts separated by shale. The principal belt, called the "Grace Darling," is about 1,000 feet wide on the surface, but widens to over 1,500 feet at a depth of 700 feet. Maggie Creek furnishes an abundance of water for all purposes, and with a railroad from Carlin, 10 miles in length, the ores could be reduced on the ground. The principal mines of the district are the Grace Darling, Comstock, Metacomet, and Orient.

On the Grace Darling a shaft has been sunk 105 feet deep, from which two drifts have been run on the ledge, one 65 and the other 45 feet. The ore averages 42 ounces in silver per ton.

On the Orient, discovered in October, 1883, the improvements made are a shaft 70 feet in depth in ore all the way, averaging $56 in gold and silver, which is sent to the Palisade reduction works.

On the Metacomet three shafts, 20, 40, and 60 feet deep, respectively, have been sunk on the ledge, and about $1,500 worth of ore is on the dump. This ore averages about $42 per ton in gold and silver. Character of ore is chloride of lead and antimony. Sample sent to Palisade for reduction returned, gold $50, silver $396.

On the Comstock mine, discovered in October, 1883, an incline shaft, 60 feet deep, has been sunk on the ledge, showing ore all the way down of the character of chloride of lead and antimony, assaying $56 in gold and silver. The croppings are very extensive.

A large number of locations have been made by various parties in the district. No work of any importance has been done on any of these claims; most of them have shafts sunk on them from 20 to 40 feet deep, all showing the same character of ore.

Goodhue & Co., owners of a number of the mines in this district, have erected smelting works at Palisade for the reduction of their ore. They have constructed a first-class wagon road from Maggie Creek to the top of Ferguson Mountain for transporting their ores to Palisade.

Safford district.—The amount of work done in this district during the year has been much less than it was anticipated would be accomplished. But little work was done on the Onondaga mine in the early part of the year. Early in the summer a force of men were set at work sinking the shaft on the ledge to a depth of 240 feet; at this depth a tunnel has been run a distance of 550 feet to connect with the bottom of the shaft. A number of drifts have also been run, showing an abundance of first-class ore at all points where the vein has been encountered. The intention is that all ore above the tunnel level shall be taken out through the tunnel.

On the Shields mine a tunnel has been run on the ledge a distance of nearly 100 feet, showing good ore the entire distance. The ore was shipped to Salt Lake City for reduction. The main shaft on the ledge is down 120 feet. The high-grade ore gives average returns of $200 per ton.

A fair amount of prospecting has been done on a number of other claims, but sufficient developments have not yet been made upon any of them to determine as to their future prospects or value.

Silverado district.—Quite a number of men have been engaged in prospecting in this district during the year. On the Queen mine a number of tributers have been engaged in working on the 100 and 160 foot levels, and have taken out sufficient ore to pay them a fair profit for their labor.

Cortez district.—Mr. Simeon Winban, owner of the Garrison, the prin-

cipal mine, has kept a large force of men constantly employed on the mine and mill, and has commenced the erection of a new 10-stamp mill to take the place of the old one, which has been in use for a number of years. The quantity of ore in sight in the mine would seem to warrant an increase of the milling facilities. This mill will contain all the modern improvements for the reduction of ores. The ore-body when first discovered showed a tendency to run into chimney deposits, but as depth has been gained it appears to run in a regular fissure, varying in width from 18 inches to 6 feet, and the value per ton has shown a very perceptible increase.

A number of the other claims have been partially developed, and some of them have sufficient ore in sight to warrant systematic working.

Pinto district.—Considerable work has been done on the mines in this district, and a fair amount of ore shipped to Eureka for reduction.

The Silver Nugget has been worked, and the Diagonal, situated on Silverado Mountain, has shipped ore to the Richmond furnace. On the Great Republic the tunnel is in about 600 feet. Some very good ore has also been shipped from the Queen, Connolly, Farrow, and Red Rose mines.

Secret Cañon district.—In the Geddes and Bertrand quite a body of high-grade ore was discovered early in the year, and operations on both mill and mine were successfully conducted up to last August, at which time the works were closed down. The mine up to the present time has yielded about $600,000, and has been prospected to a depth of 300 feet. The reduction works are extensive.

Bald Mountain district.—Quite a number of men were engaged in sluicing for gold in this camp during the months of June, July, August, and September, and obtained fair returns for their labor. The gold is a bright yellow, varying in size from fine sand to nuggets of the value of $1.50. The great drawback to the successful working of these claims is the lack of water, and, the only water obtainable being that from the melting snows on the neighboring mountains, unless the snowfall is unusually heavy during the winter season the quantity of water is not sufficient for sluicing purposes more than four to six weeks in ordinary seasons.

Mount Hope district is situated 25 miles north from Eureka, on the line of the Eureka and Palisade Railroad, 1 mile west from the road. It was formerly known as Mount Garry district. The only mines upon which work has been done are Mountain Chief, Wren, Rhoder, and Husty. These claims show ore ranging in value from $20 to $50 in silver, and from 32 to 65 per cent. in lead. The ore, owing to the large percentage of lead it contains, finds a ready market at Eureka and Palisade, where it is used as a flux in the smelters.

Bullion Hill district.—A good deal of work has been done, and considerable ore has been shipped to Salt Lake from this camp.

On the Sweepstakes about 90 tons of ore, containing, bromide, native silver, and red oxide of silver, were taken out and shipped to Salt Lake, netting the owners a handsome return. They have commenced a thorough exploration of the mine, and expect to more than pay the expense of the work out of the ore already on the dump.

A large amount of money has been expended in running the tunnel on the Hector to strike the vein. Some very rich ore is being taken out and sent to Salt Lake for reduction.

The Silver Star has produced some good ore, containing, bromide, red oxide, and galena, and a number of other claims showing very good ore have been opened up.

The assessors' returns state the production of the mines of this cou to have been as follows:

Name of mine.	Quantity worked.	Value.	Name of mine.	Quantity worked.	Va
	Tons.			*Tons.*	
Albion	122	$3,641 48	Herculean	15	
Alexandria	122	4,681 01	Hillside	8	
Altoona	121	10,700 26	Irish Ambassador	38	2,
Austin	23	6,070 86	Ivy and Co	4	11
Antelope	30	1,515 56	Irvin	9	
Antonozzi	12	927 93	Idaho	244	5,
Bertrand	3,211	29,031 17	Industry	6	
Berryman	2	134 87	Jackson	488	19
Bald Eagle	131	10,549 67	King Lear	143	11
Bowman	69	2,315 65	Lone Pine	68	1,
Barton	3	199 26	McCuen	2	
Banner	61	3,623 92	Macon City	25	2
Black Hawk	3	48 71	Members	415	7,
Bartlett	4	81 59	Margarita	123	4
Bankee, Spencer & Co	6,440	47,455 39	Mount Hope	76	1,
Colorado	76	4,354 99	Montineer	164	5
Connolly	74	2,013 39	Maria	39	2,
Cuff	4	112 08	Orange	18	1,
Clipper	2	65 03	Oriental & Belmont	73	2,
Cameron	9	257 51	Pinto	5	
Dugout	49	1,861 13	Pope	1	
Dixon	1	91 33	Phœnix	176	7,
Dewitt	2	149 72	Paul Pry	142	5,
Drayer	3	60 95	Rose	11	
Dead Broke	14	1,550 00	Reeves and Berry	27	2,
Endeavor	4	233 49	Republic	24	
Eureka Star	23	949 12	Red Bark	11	
East Oakland	3	238 97	Ruby and Dunderberg	2,297	73,
Emerald	20	898 77	Richmond Mining Co. of Nevada	34,194	492,
El Dorado No. 2	9	1,025 30	Reserve	115	6,
Eureka, Consolidated Mining Company	12,520	375,813 39	Scorpion	36	1,
Eureka Tunnel and Mining Company	335	15,649 27	Silver Pick	281	14,
Excelsior	22	2,111 54	Spink	5	
Enterprise	1,240	12,450 00	Silver Lick	632	22,
Estey	1	54 26	Silver Reef	4	
Fourth of July	9	243 38	San José	7	
Five Twenty	46	967 16	Silver West	55	1,
Frager & Millend	29	660 33	Silver Connor	869	28,
General Shields	14	800 00	Tyndall	5	
Golden Era	1	26 71	Tiger Lily	57	1,
Goliath	7	323 00	Williams	25	1,
General Lee	340	7,155 61	Welsh and Evans	4	
Giant	16	1,020 17	Winnipeg	3	
Gilmore	1	33 40	Western Globe	2	
Grant	63	3,064 60	Waters	23	
Garrison	1,839	118,068 28	Wood Chopper	12	1,
Hamburg	803	28,114 57	X. Y. Z	4	
Horace Toney	5	159 18	Total		664,
Hyer C	3	83 50			

HUMBOLDT COUNTY.

Arabia district.—Considerable prospecting has been done in this trict during the past year. The ores carry a large percentage of metal.

American district.—Only assessment work has been done, and no velopments of note have been made.

Central district.—On the Marietta the shaft has a depth of 320 from which point drifts have been run upon the ledge, opening large body of good milling ore.

The Railroad mine has been opened up, showing an immense bo low-grade ore, the ledge being nearly 30 feet wide. The owners l erected a 5-stamp mill on Humboldt River for the purpose of redu the ore, and are getting very satisfactory returns.

A force of men has been engaged in developing the Locomotive *which* shows a large body of fine ore.

Cedar district.—The Humboldt Queen, situated about 3 miles north of the old town of Limerick, has during the year shipped to Denver about 145 tons of ore, from which the returns were satisfactory, and 75 tons more are ready for shipment to the same works. A shipment of 35 tons was also made to Melrose, Cal., but with less satisfactory returns. Thirteen hundred feet of drifts have been opened on the ledge, with stopes from 75 to 150 feet high.

Dun Glen district.—The only mine upon which any amount of work has been done during the year is the Lang Syne. When first discovered it was worked in an extravagant manner, and the rich pocket having been exhausted the mine (although containing large quantities of low-grade ore) was considered unprofitable, and for several years has remained idle, but is being put in working order.

Gold Run district—The Great Republic, a San Francisco corporation, has commenced operations on their mines. They have two leads, one of which is 30 or 40 feet wide, and both carry considerable ore of a low grade.

Paradise Valley district.—The Paradise Valley Mining Company has prosecuted work vigorously on its mines, and a large quantity of ore has been extracted and reduced during the past year. The mines owned and operated by this company are the Wild Goose and Paradise Valley. On the night of November 27, 1884, a 10-stamp mill, which cost the company $60,000, was destroyed by fire.

On the Live Yankee, Bullion, Rattler, and Julia, work has also been satisfactorily prosecuted. A 5-stamp mill has been erected on the Live Yankee, and the ore in sight, with that on the dump, will be sufficient to keep the mill in constant operation for a year. From the Bullion, Rattler, and Julia, some very rich ore has been extracted.

The yield of the mines of the Paradise Mining Company during the year was as follows: One hundred and five bars, valued at $215,258.52; disbursements for mining, $70,074.88; disbursements for milling, $69,-861.72. In this camp a great deal of prospecting has been done and many promising claims have been uncovered.

Rebel Creek district.—A Salt Lake company has commenced on the Ohio (the principal mine in this district) the erection of the necessary buildings for its thorough working.

Spring Valley district.—During the past year considerable work has been done upon the mines in this camp. Several car-loads of first-class ore from Eagle mine have been shipped for reduction to San Francisco, netting about $1,000 per ton. Most of the ore is, however, worked at Mill City, and gives fair returns.

On the Grizzly mine a number of men have been employed, and some high-grade ore has been found.

Sacramento district.—Work upon the Humboldt Queen, the principal mine of the district, has been kept up during the year, and the ore extracted has been sent to Denver for reduction. One of the largest and richest bodies of ore yet uncovered was found last August at a depth of 125 feet.

A small ledge of silver ore has been recently discovered in an adjoining claim.

Willow Creek district.—During the past year a number of miners have been prospecting the numerous ledges in this camp, and many of the claims show considerable ore. No improvements, however, of a lasting or permanent character have been made on any of them.

White Cloud district.—A cobalt mine is being developed in this district, the ores from which carry as high as 45 per cent. of the metal.

The assessors' returns show the production of the mines which have reported to have been as follows:

Name.	Tons.	Value.
Paradise Valley	5,016	$195,737 61
Ross Mining and Milling Company	5,346	42,065 71
Ohio	17	3,870 00
Total	10,379	241,673 32

LANDER COUNTY.

Bullion district.—The Lady of the Lake mine never looked better than now; some 100 tons first-class ore being on the dump. During the summer it shipped about $20,000 worth of bullion.

The Riverside has been producing free-milling ore, running from $80 to $1,000 per ton; a car-load, valued at $3,000, is shipped per month. The shaft is down 75 feet, with a tunnel 300 feet long.

Galena district.—This district is beginning to prosper. The Trinity has good ore in sight, and several men are at work on the Temby, which is producing good ore. There is a good showing of galena ore in the Honora O'Neal.

Jefferson district.—The Harrison Brothers mine has resumed work, and excellent ore is being extracted, the value of which cannot, however, be accurately ascertained. Work is also being prosecuted on the Cora D., and the property is looking well.

Lewis district.—Extensive improvements are being made on the property of the Pittsburgh Company, which shows up well as the tunnel is advanced.

Reese River district.—The Manhattan Silver Mining Company have operated their mill for ten months during the year, producing from their mines 5,204 tons of bullion, averaging $231.50 per ton, which was shipped to London, and yielded $1,128,909.91. The mines of this company have been worked continuously for the past twenty years, and are estimated to have produced over $20,000,000. The lowest depth attained is only 1,200 feet, the ledge being small and the ore rebellious and expensive to work. It is estimated that it costs nearly $26 per ton to reduce the ores. The expenses for the year were $1,072,662.60, leaving a profit of over $58,000. These mines gave employment to 462 men, the work performed during the year consisting of 173,575 square feet of breasts, 582 linear feet of winzes and chutes, 869 linear feet of inclines, 8,549 linear feet of drifts, and 2,143 linear feet of cross-cuts. The report of the company shows that the general improvements on the mine amounted to over $62,000.

The Farrell ledge, from which considerable ore has been taken in the past, has been worked to the 1,800-foot level at the Paxton incline and to the 800-foot level of the Lander share. These levels correspond in depth, and but very little ground remains, and what does is being worked by tributers. The report states that the ground west of this, in which prospecting has been carried on, has failed to show continuous ore-bodies.

The Oregon ledge, while it has produced considerable high-grade ore, has not shown as large a chimney as first developments indicated.

The Naiad Queen, one of the oldest mines in this district, which was abandoned years ago, has recently been relocated and is being reopened

promising shape. It is situated a few rods in the rear of the Manttan mill, and directly beneath the bed of the main ravine, or Pony ıñon. Its former owners worked it to the depth of about 175 feet, d had a promising ledge of ore, but, having too much water to conıd with, could not make it pay, and were obliged to quit. The prest proprietors have erected steam-hoisting works, and are repairing ; old incline preparatory to working the abandoned ledge.

The Silver Side mine produced, during 1884, 117½ tons of ore, avering 150 ounces silver per ton. Work was prosecuted three hundred ys with 15 men. The condition of the mine is as follows: Drifts, 300 t; shafts, 100 feet; raises 150 feet; cross-cuts, 80 feet.

Lewis district.—A company has been investigating the copper mines the vicinity of Battle Mountain, with a view to purchasing and work- them.

The assessor's report shows the production of the mines of this county 1884 to have been:

Name of mine.	Tons.	Value.
ıhattan	3,532	$666,605 24
umbia	20	5,808 43
Total yield	3,552	672,413 67

LINCOLN COUNTY.

Bristol district.—Messrs. Nesbitt Bros. and R. H. Elam are working arge lot of tailings; 700 tons have been worked, the average assay lue of which was $9.60 per ton.

The Floral Mill Company produced from screenings and ores, from nes in the immediate vicinity of Pioche, 804.54 ounces gold, and 277.34 ounces silver.

The Day mine yielded during the year some rich ore covered with rn silver assaying from $300 to $1,700 per ton; this ore was taken m the fourth level. The ore recently taken out is a copper-colored bonate, with rich chloride of silver through it.

The Day Company owns the Day, Mendha, and Hamburg. The repts for bullion from these properties amounted during the year to),795.21, and for ore sold $2,216.45. Some good ore has been taken m the Hamburg, and 6 men have been employed.

In the Mendha a drift has been run at the 114-foot station. About 50 60 feet along the drift a large amount of ore was extracted. At the d of this drift lime rock was encountered, which was run into for 10 t, when ore was again found. Assays of this ore ran from $120 $200 per ton. There are 18 men at work.

Comet district.—The Freudenthal mine gives much promise. The lge is from 2 to 3 feet wide, and contains a streak of about 8 inches at assays from $140 to $450 per ton. The whole ledge, it is thought, ll average about $80.

Silver Park district.—The property of Mr. Felix Knight, consisting three patented claims, has been bonded to a Salt Lake party. The dge is a contact between quartzite and granite. There have been three ıafts sunk 400 feet apart, 100, 250, and 238 feet, respectively, in depth. he shafts are inclines, having been sunk in the ledge matter. The ore as been exposed from the top to the bottom in each of the shafts. At ıe bottom of the 250-foot shaft on the Sam. Tilden the drift has been un for a distance of 300 feet. The ledge is 8 feet in width, through

which runs 4 feet of clean ore, which samples 245 ounces silver to the ton. The ore is quartz-bearing horn and native silver. Between $12,000 and $15,000 worth of ore is on the dump, and several hundred tons of ore are exposed in the various workings of the mine ready to be stoped.

Taylor district.—The mines in this district have never shown any degree of permanency. The Monitor and Argus companies have large bodies of rich ore.

The assessors' returns show the reported production of the mines of this county during the past year to have been:

Name of mine.	Tons.	Value.
Day	4,224	$95,118 45
Southwestern	1,884	73,820 02
Floral Mill	578	4,072 61
Black Jack	73	2,095 10
Lucky Jim	12	378 84
Wall Street	12	310 20
	6,783	175,795 22

LYON COUNTY.

Dayton district.—The Franklin mine produced last year in gold $2,100, and in silver $11,500, employing 5 men.

Iaqua, Brooks & Co.'s mill, operated on quartz tailings, produced $1,800 in gold and $14,600 in silver. Five men were employed during the period of operations.

Delaware district.—The Edison mine has worked off a small lot of ore, assaying $42.07 per ton, but the quantity is very small.

The Silver King Mining Company produced last year $320.90 in gold and $184.35 in silver.

The State assessor reports the production of this county to have been over $270,000 during the year, reported by the following properties:

Name of mine.	Tons.	Value.
Schlomberg Bros	886	$16,410 74
TAILINGS.		
Woodworth Mill	29,020	101,805 70
I. M. Douglas & Co	33,379	88,105 80
Iaqua, Brooks & Co	1,950	10,750 00
Atlanta Mill Company	8,385	25,811 92
Franklin Mill	2,780	11,100 00
Excelsior Mill Company	2,267	14,057 06
Little Bonanza Mill	600	2,600 00
Total	78,381	254,230 57
Total ores	886	16,410 74
Total tailings	78,381	254,230 57
Total yield	79,267	270,641 31

NYE COUNTY.

Belmont district.—On the Belmont, the principal mine, work has been vigorously pushed the past year, and considerable rich ore has been extracted; the workings have been extended in the virgin ground. The ledge carries chloride and black metal, both running high in silver. *Much* rich ore is exposed, and, in consequence, the force of miners has

been increased. The capacity of the leaching works has been doubled, and the capacity of the cooling floor quadrupled.

Some very fine chloride ore has been taken out of the Monitor Belmont, adjoining the Belmont, and reduced, giving very flattering results.

Ellsworth district.—Little more than assessment work has been done on the mines in this district, except the Mount Vernon, upon which a considerable amount of money has been expended. The main shaft has been sunk to a depth of 159 feet, and it has a capacity of 7 by 9 in the clear. The tunnel has been extended 700 feet, and the tunnel level has been prospected for a distance of 500 feet on the course of the lodes. About 66 feet below the tunnel they have intersected Kohinoor ledge, and have cross-cut 200 feet toward the Alhambra lodes. The company has a tunnel right of 3,000 feet.

Florence district.—The principal mining claims in this district are the Rattlesnake, the Louisa, Oliver Twist, and Sedan, upon which, and others, considerable work has been done in the past year. Most of the ore in this district is free milling and of a high grade, carrying a slight percentage of gold.

Grantsville district.—Grantsville has been very quiet during the year. Upon the Alexander, which has heretofore been the prominent mine in the district, nothing has been done.

John Centras, owner of the Good Luck and Belvidere mines, writes as follows: "Upon the Good Luck 2 inclines have been sunk, one to a depth of 80 feet, the other to a depth of 97 feet, and one tunnel 60 feet upon the ledge. About 1,000 tons of ore have been extracted and are on the dump. Assays of this ore range from $25 to $300 per ton. A few sacks of sorted ore worked in San Francisco yielded $153 per ton. Nothing but assesment work has been done on the Belvidere, an extension of the Good Luck, the formation being similar, and ore of like character."

Hot Creek district.—No developments of any importance have been made on the mines of this district, owing to the great cost of transportation by teams to the railroad, which prevents any attempt to reduce the ore to bullion, the ores of the district containing a large percentage of lead.

Jefferson district.—Quite a number of men have been employed on the mines during the year, and considerable ore has been mined, a portion of which was worked in arrastras, while the ores carrying base metals were shipped to Eureka for reduction. The principal mines are the Keystone, St. Charles, Silver Point, Silver Vein, Jefferson-Carbonate, and Woodbridge. Charles Kaurohat, owner of the Jefferson-Carbonate, has extracted from the upper levels considerable ore, which was shipped to Eureka. No attempt has been made for the past few years to work the lower levels of any of these mines, owing to the strong flow of water coming in from what is termed a back ledge, and the lack of requisite machinery to handle the water.

Manhattan district.—During the past year parties in the interests of English capitalists have been quietly acquiring control of many of the mines in the district, but no permanent improvements have yet been made by the new owners on any of these properties.

Mammoth district.—Nothing of interest has been done in this district during the year 1884.

Ophir Canyon district.—Good prospects are reported from this district, but no improvements of a permanent character have been made on any of the mines.

Philadelphia district.—The Belmont Company has employed a force of men upon the Barcelona mine. Considerable fine ore has been extracted.

Red Canyon district.—Some very fine prospects have been found in this district in 1884. The owners of the Sunflower mine, after running 80 feet of tunnel, reached the ledge, showing 3 feet of rich gold and silver bearing ore.

Tybo district.—This district has been comparatively inactive during the past year. The only mine that has been operated to any extent is the Two G. mine, owned by the Tybo Consolidated Company. During the past year it has been operated to a limited extent, owing to the heavy expense attending the development of the property and the reduction of its ores. The greater portion of the ore averages only from $15 to $25 in silver per ton, so that with the present facilities for mining, reduction, and transportation, coupled with the cost of material and labor, it is impossible to work at a profit. A correspondent estimates the yield in gold at $1,500, and in silver $34,000 for the past year.

Upon the Lucas, adjoining the Two G., a shaft 80 feet deep has been sunk, at which depth a ledge 4 feet wide was encountered, samples from which assayed $60 per ton. The Keyser tunnel has made fair progress towards the ledge, and a few men have been employed a good portion of the year in sinking and timbering the Magnolia shaft.

Union district.—The main tunnel on the George Martin mine, in Berlin Canyon, has been advanced to a distance of 120 feet, and 20 feet from its face a strong ledge showing a fair grade of ore has been found.

The assessors' returns state the production of the mines of this county to have been as follows:

Name of mine.	Tons.	Value.
Barcelona	389	$12,663 18
Belmont	815	29,585 43
El Dorado	266	8,635 20
Silver Point	5	1,012 80
Trowbridge	12	1,074 94
Two G	771	15,004 56
Total	2,258	67,976 11

STOREY COUNTY.

Washoe district.—Considerable development work during the year has been done in the various mines of this district.

In the Utah mine new ground has been explored, and a large amount of work done on the 1,350-foot level, but nothing of value has been discovered. On the 1,450-foot level a north lateral drift was run for nearly 300 feet in vein material the entire distance. This drift was started at a point 200 feet east from the incline station, but indications of a heavy flow of water were met, and the work was discontinued. A southeast cross-cut was started at a point 200 feet east of the incline station and run a distance of nearly 350 feet, being in vein material from the start, showing stringers of quartz and clay, but of no value. A drift was run south for a distance of 240 feet on the 1,950-foot level. About $80,000, obtained from assessments, were expended during the year in work on the mine.

In the Union Consolidated explorations were carried on below the 2,900-foot level; considerable new ground was prospected down to the

3,300-foot level and a number of drifts were run. No ore of value was discovered in the lower workings, which were carried on jointly by the Mexican, Sierra Nevada, Union Consolidated, and Ophir. The lower main workings in the four mines were connected for the purpose of ventilation and drainage, as well as to facilitate explorations at this great depth. Mr. W. H. Patton, superintendent, in his annual report to the board of trustees on July 1, 1884, in speaking of the work done, says: "While no ore of any milling value has been exposed by our explorations during the past year, our cross-cutting and drilling have demonstrated that the Comstock vein has a width of at least 500 feet on the 3,100-foot level and carries mineralized material. No work was done above the 2,900-foot level during the year, except such as was necessary to keep the machinery in proper shape and ordinary repairs in the drifts and winzes to maintain the extensive system of ventilation and drainage. About $335,000 were expended in the work during the year ending June 30, 1884, of which over $250,000 were from assessments and $80,000 received from other mines for labor. In the Ophir, all the ore mined has been taken out of the old workings above the 250-foot level through the old central tunnel. The amount of ore extracted was 5,524 tons, of which amount 4,700 tons have been milled, yielding $66,390.17, being at the rate of $14.12 per ton, or 70 per cent. of the assay value. There remained on hand in bins at mine and mill at the close of the year, 824 tons. In July a drift was started at a depth of 500 feet in a westerly direction from the main shaft to cut the bottom of the old Mexican shaft. At the close of the year this drift had been run a distance of 983 feet, leaving 137 feet yet to run. The object of this drift is to drain the heavy influx of surface water, which has heretofore prevented explorations below the 250-foot level of the old workings, and also to enable prospecting to be carried in new ground which may have been left above the 500-foot level. On the 1,500-foot level a drift was run to the north line of the California mine, passing through the old stopes and workings. A west cross cut was started from this south drift at 280 feet from the station, and advanced 60 feet; an east cross-cut was also run from same point a distance of 45 feet. Nothing of value has been found on this level. The work on the 1,600, 1,700, 1,900, 2,000, 2,300, 2,500, 2,700, 2,900, and 3,100 levels has been confined to keeping open the various drifts and winzes used for drainage and to the necessary repairs to the machinery connected therewith. In this work there was expended during the year ending November 30, 1884, about $275,000, raised principally by assessments on stockholders.

On the 2,000 level of the Gould & Curry a joint west cross-cut was started and run a total distance of 700 feet. In this drift streaks of quartz were encountered which, although of favorable character, proved of no value by assay. On the 2,700 level, from the bottom of the joint winze, a cross-cut was started in a southeasterly direction and run a total distance of 40 feet. Heavy streams of hot water flowing from the roof and sides of this drift forced the suspension of work; water being also found in large quantities in the Best & Belcher drift to northward, the level was abandoned. At the Bonner shaft, from the 1,200 level station, the north lateral drift was cleared out and retimbered to the Best & Belcher south line. From this point a joint east cross-cut was run a total distance of 152 feet without good results. On the 825 level a south drift was run to the Savage Company's north line. From this lateral drift a west cross-cut was run along the south line for a distance of 200 feet, cutting numerous stringers of fine-looking quartz, giving assays as high as $10. Nearly $270,000 were expended in this work, $100,000 of which were received from sale

of supplies and labor for other mines and $1,134 for sale of ores. Nothing was done at the Osbiston shaft except pumping water from the 2,000 level, awaiting the result of operations on the bottom levels of the mines next south.

On the Mexican mine, in the 1,600, 2,000, 2,300, 2,500, and 2,900 levels, the work done has been confined to keeping up the various drifts and winzes used for drainage and air-ways, and the necessary repairs to the machinery connected therewith. The main lateral drift on the 3,100 level was connected with the joint Union and Sierra Nevada winze, in the Union Company's ground, last February, bringing the natural ventilation down to this depth. About the same time east cross cut No. 1 was extended to a point 42 feet from the main lateral drift, and a chamber was excavated from which to start a double-compartment winze. This winze was started in April last, and reached the 3,200 level in June. After cutting out a pump and tank station at that level the sinking was resumed, the Sierra Nevada, Union Consolidated, and Ophir companies contributing proportionately with this company towards the payment of the expense, each company having, by resolution heretofore adopted, agreed to pay one-fourth of the expense of sinking the winze to the 3,300 level. This level was reached and a station excavated about the middle of last October. Diamond-drill holes were then run on this level north 145 feet, west 200 feet, and east 30 feet, showing no value. East cross-cuts Nos. 2 and 3, and west cross cuts Nos. 2 and 3, have been run in a distance of 24 feet from the main lateral drift at points 100 and 200 feet, respectively, from the north line, and a diamond-drill hole was run ahead from the face of west cross cut No. 2 with favorable results.

At the Sierra Nevada, Mexican and Union shaft work has been confined to repairs required to keep it in working condition during the year. The quantity of water pumped from the shaft during the year has averaged 1,270,000 gallons per day. Over $190,000 were expended from December, 1883, to October, 1884, principally money raised by assessments on stockholders, of which over $50,000 were for labor.

In the B st and Belcher considerable prospecting was done on the various levels, much of the old workings were overhauled and timbers in many instances renewed. The principal prospecting was done on the 825 and 2,500 levels. The principal work being confined to opening up new ground by cross-cutting from the north lateral drift on the 825 level. Good indications were found on the 1,200 level. A body of low-grade ore was encountered on the 2,300 level, assaying from $7 to $10 per ton. There is still a block of ground 346 feet in depth above the 479 level, in which no work has yet been done.

Work in the Consolidated Virginia has been carried on as low as the 2,900 level. A great deal of prospecting has been done with the diamond drill, without, however, obtaining any satisfactory results. In the lower levels large quantities of water were encountered.

About the same character of prospecting has been carried out in the California mine.

In June Senator J. P. Jones leased the upper levels of both these mines for the purpose of extracting and reducing the low-grade ores, large bodies of which remain in the various levels between the surface and the 1,200 level. Since the lease went into effect a force of men has been engaged in repairing and retimbering, preparatory to extracting ore.

The Chollar mine has been a steady producer of milling ore from the

upper levels during the year. Considerable prospecting has also been carried on in the mine, and much new ground explored.

At the Savage mine prospecting has been pushed on the various levels where any favorable indications could be found. Miners have also been engaged in repairing the upper levels, in order to commence the extraction of low-grade ore, of which the mine contains large quantities.

The Hale and Norcross has engaged the attention of the speculators during the past year. On the 2,800 level considerable new ground was opened early in the year, and it was the general belief that some very fine ore had been discovered. Work was also carried on vigorously on the 2.900 and 3,000 levels, most of it being in the direction of the ore-body encountered on the 2,800 level to ascertain if it extended down to either of these levels. Though both levels have been pretty thoroughly explored, the public have no information as to the result. A large body of low-grade ore, assaying from $14 to $20 per ton, was found in the old upper workings. This ore is being taken out and shipped to the Eureka mill, on the Carson River, for reduction, and gives fair returns.

At the Yellow Jacket the daily average yield of ore from the upper levels is about 150 tons, which is sent to the mills on the Carson River for reduction. The lower levels of this mine have remained under water during the year. No attempt at drainage has been made, consequently no explorations have been attempted in any of the lower levels, all prospecting done being confined to the upper levels. The following is the yield of bullion from this mine during the year, together with the cost incurred in extracting same: Gold, $294,798.94; silver, $489,853.66; aggregate of pay-rolls of men at mine for year ending December 31, 1884, $218,240.75.

The Belcher mine has been engaged in shipping during the year ore from the old workings in upper levels to mills on Carson River. Considerable work has been done on the lower levels opening up new ground.

At the Crown Point mine prospecting has been carried on largely in the lower levels, and some new ground has been opened up with fair prospects. From the old workings in the upper levels daily shipments of from 80 to 100 tons of low-grade ore have been made to the mills on Carson River.

In the Potosi considerable exploring has been done on the 2,800-foot level, the work being carried on jointly between this company and the Chollar Company. Some favorable indications have been met with. Considerable ore has been extracted from the old workings on the upper levels.

In the Exchequer mine explorations have been carried on in the 500, 600, and 900 levels, on each of which large bodies of mineral-bearing quartz have been encountered, the assays from which range from a trace to $10. It is the intention of the company to thoroughly explore these levels in the hope that pay ore may be discovered connected with this large body of low-grade quartz.

The Kentuck mine has been operated under a lease. The lessee has worked the old levels, and has kept a force of men engaged in taking out the low-grade ore left there at the time the mine was first opened up, and which was then considered of too low a grade to mine and work at a profit. The company has received as a royalty on the ore extracted the sum of $23,243.72.

No work of any note was done in the Overman mine during the year

in the way of prospecting Operations were chiefly confined to t extraction of ore from the 200-foot level, the average daily outp being about 50 tons, yielding in gold $18,388.84, and in silver $23,008. a total of $41,397.10.

In the Alpha mine a great deal of work has been done on the 5 600, and 700 levels. Numerous drifts and cross-cuts have been run, considerable new ground opened up. A large body of low-grade ore discovered on the 500 level early in the summer. This has been cr cut in a number of places, and has been found to be 200 feet in wi and extend down to the 900 level.

Large bodies of low-grade milling ore have been discovered in Aude mines during the year. Very little has yet been extracted, intention being to make a thorough exploration of the ground bef undertaking to commence the extraction and milling of ore.

Work on the Scorpion mine for the year has been confined to drift and cross-cutting on the 500 level. A large area of ground has b opened in this level, but nothing of value was encountered.

At the Alta and Benton mines the principal work has been on 2,150 level. Both mines have been operated through the Alta sh Progress of the work has necessarily been slow on account of the str flow of water from the lower levels of the Gold Hill group of mines, also from the Silver Hill and Justice shafts. Much delay has been cau in running the east drift, and more water has been encountered than been found in the one running west. The pump has been kept in act and constant operation. In the east drift some very favorable ind tions have been encountered. As soon as this drift reaches the e wall of the vein cross-cuts will be run north and south, which will op up a large area of new and entirely unexplored ground. From tests m with the diamond drill on this level, a large ledge of low-grade or known to exist. Owing to the strong flow of water, however, it will quire some time to thoroughly prospect this level. Over $143,000 w expended during the year, some $7,000 of which were obtained from Justice mine for pumping, and the remainder by assessing the st holders.

The report of the secretary of the Benton Consolidated, submitte the company at the annual meeting held July 30, 1884, shows the rece from two assessments to have been $32,397, and the disburseme $39,352.09.

The Benton Consolidated, Alta, and Lady Washington Consolida Mining Company are all under the same management. The repor the secretary of the Lady Washington shows the receipt from one sessment of $5,943.

The Keyes mine, situated in Six Mile-Canyon, upon which a forc men have been engaged, shows some very rich ore.

The Chollar, Savage, Hale and Norcross combination shaft has tained a depth of 3,000 feet. At this depth a station has been cut A new and complete set of hydraulic pumping machinery to be pla in position at this point has been built and tested at the Risdon I Works, San Francisco. They are now engaged in shipping the chinery and placing it in position.

About the 15th of November, 1884, the companies operating the U Consolidated, Sierra Nevada, Mexican, Ophir, and Consolidated V ginia, at a meeting held in San Francisco, resolved to abandon for present all work below the 2,700 level in all those mines. This con sion was reached after considerable discussion and consideration of fact that the 3,300 level of the Mexican mine has been prospected

a distance of 500 feet in all directions from the main shaft by means of the diamond drill, and nothing of value was encountered. Between the 2,700 level and the surface there is considerable new ground in each of those mines in which no work has yet been done. It is the intention of the different companies to thoroughly prospect this ground as rapidly as possible. Owing to its favorable location and close proximity to ground from which large and valuable bodies of rich ore have heretofore been extracted, there are at least reasonable expectations that good ore may be discovered.

Sherman district.—This district is situated about 6 miles northwest of Virginia City and includes a highly mineralized territory. Before the discovery of the Comstock this district had quite a population engaged in prospecting. The camp, however, laid idle until within the past two years, when it regained some of its early popularity. Within the past year a large number of locations have been made in the district; upon many of them work has been done, showing in most instances strong ledges of very good ore.

The Burke mine is the only one upon which any systematic developments have been made. A shaft 200 feet deep has been sunk, showing a true fissure vein of good ore, varying in width from 4 to 10 feet. The greater portion of the ore between walls will pay a profit on cost of working.

The assessors' returns show a production in excess of last year of over $600,000 and the amounts produced by the mines reporting:

Name of mine.	Tons.	Value.
Belcher	34,953	$467,858 16
Crown Point	39,217	489,006 12
Kentuck	17,257	298,999 06
Yellow Jacket	54,716	784,652 59
Potosi	14,062	161,187 55
Gould and Curry	1,393	19,206 18
Lady Bryan	1,372	8,134 50
Monte Christo	2,480	21,186 76
Hale and Norcross	13,047	178,995 02
Ophir	3,679	48,864 81
Imperial and Challenge	932	15,259 56
Consolidated California and Virginia	1,814	32,150 06
Caledonia	3,310	37,189 38
Total	188,232	2,562,689 75
Tailings worked	7,806	36,171 53
Total yield	196,038	2,598,861 28

WASHOE COUNTY.

Argentine district.—Mr. Edward Harris, owner and locator of the Harris mine, gives the subjoined brief review of the discovery and condition of his property:

"The ledge being a blind one, a cut was run 30 feet in length and a small stringer of gold ore found, after which an incline was sunk 35 feet in depth. The quartz gave out at a depth of 17 feet in the incline. What ore was found milled $400 per ton. A drift was then run out 55 feet in a southerly direction from bottom of the incline and 2 feet of low-grade quartz struck. A second drift from the easterly direction of the incline was then worked, and at 40 feet cut a large ledge of broken quartz, from which some very fine specimens of gold ore were taken. Work was then abandoned for a time, and upon its resumption a tunnel was run into the hill about 100 feet west of the incline. At a depth of 40

feet a silver ledge, 16 inches wide, was found, assaying from $20 to $1,700 per ton, and a winze sunk to the depth of 35 feet from the face of the tunnel. The ore having improved, a drift was started out and followed the ledge 165 feet in an easterly direction. At this point the gold vein intersected the silver ledge; a winze was sent down 60 feet and a drift run out 40 feet on the ledge. A third winze was sunk at the face of the drift 50 feet in depth, and drift run from bottom 35 feet on the ledge, which at this point, 210 feet from the surface, had attained the width of 4 feet. Being satisfied with the prospect, a new shaft was started, which is down 75 feet, and 6 men are employed about the work. The mine has so far been prospected to a depth of 210 feet on the ledge and 100 feet in length. The ore taken out while doing this work has paid for all improvements about the mine, and besides netted the owner a handsome dividend. The ore has been of a very high grade, some selected lots yielding $40 per pound. The silver ledge has never been prospected, but where run through it gave some beautiful specimens containing native silver, ruby, black sulphurets of silver, bromide, and chloride of silver."

On the West Harris a shaft has been sunk 90 feet, and a drift 19 feet run south. Work was discontinued before the drift had reached the ledge.

The ledge of the Washoe Giant shows some fine quartz, assaying from $10 to $70 per ton, but the developments amount only to a tunnel now 64 feet long. There are several stringers of quartz in face which give low assays in gold.

Smith and Marker mine lies east of the Harris. In sinking two shafts of 100 feet each several stringers of quartz were found.

Burns and Dunlop mine, lying north of the above, has a shaft 90 feet deep, from which a drift was run out on ledge about 2 feet in width of solid quartz giving assays of gold and silver.

The Sage Hen is a relocation of the Hazard, which was worked by a tunnel 900 feet in length and an incline of 100 feet in depth. The ore worked $48 per ton in silver, also containing a small percentage of copper and lead. All work on this mine was discontinued in 1867. Since its relocation a lot of 5 tons of selected surface or float ore gave a return of $206 in silver per ton.

Sherman district.—The Burke is not being worked at present, but the following was the result of six assays made from its ores:

Assay—	Silver.	Gold.	Total.
No. 1	$813 70	$401 65	$1,215 35
No. 2	596 94	50 23	647 17
No. 3	562 51	175 71	738 22
No. 4	801 15	125 48	926 63
No. 5	1,413 20	502 32	1,915 52
No. 6. A trace of copper			

Pyramid Lake district.—The development of the Crown Prince Gold and Silver mine consists of a shaft at the west end 430 feet in depth; a tunnel on the east end following the course of the mine about 300 feet; also one uprise of 45 feet about 100 feet from commencement of tunnel; and one shaft about the center of the mine 110 feet deep.

The assessors' returns give the production of only one mine, the Harris, which was 18 tons, valued at $3,093.90.

WHITE PINE COUNTY.

Aurum district.—A great deal of prospecting has been done in this camp during the year. The principal mines are the Sadie L. and the Blue Bell. The former is opened by two tunnels and an incline shaft to the depth of 500 feet, and has developed a small ledge of rich ore. The Blue Bell has reached a depth of 400 feet by shaft and tunnel. The vein is a contact between lime and shale. A large deposit of rich ore has been stoped out the past year along the line of the tunnel level. From the Blue Bell mine there is a track around the side of the mountain to a tramway leading down to the ore-house at the mill, where all the ore handled by the company will be reduced. The mill, intended for wet crushing, is a 10-stamp, with all improvements.

The Aurum, in *Silver Canyon district*, is a fine prospect, for the depth, some 20 feet. Assays run from 11 ounces in silver as high as 267 ounces. A shipment of 690 tons of ore as a test worked at the rate of $300 per ton.

Cherry Creek district.—The various mines of this district have not employed during the year as great a number of men as in former years, owing partially to the financial troubles of the Star Mining Company, the lien claims against the property being still in litigation. On the Rob Roy, Messrs. Taylor & Co. have sunk an incline nearly 40 feet on the ledge and have taken out about 5 tons of $200-ore.

The incline shaft on the Ti-Cup is down about 600 feet, and eight levels have been opened up. The hanging wall is shale-slate, the foot-wall limestone.

There are two belts in this section. The upper ledge is a contact vein traceable for 5 miles. The principal mines on it are the Ti-Cup, Bob Tail, Rob Roy, and the Chance. South of the Ti-Cup are the Bohemian Girl, the Blacksmith, Steptoe, and others. The ore is free milling, and much of it has run from $60 upwards per ton, and worked up to 90 and 95 per cent. The Rob Roy is said to produce ore worth from $80 to $100. The lower ledge consists of a series of fissure veins cutting the formation from east to west. The ore as a rule is refractory, needing roasting.

The most promising mine is the Star, not now worked; next may be named the Exchequer, the Big Giant, the Grey Eagle, Chief of the Hill, and west extension of the Star, all in one group.

On Flagstaff Hill, 2 miles south, are the Pacific, Mary Ann, the Flagstaff, Little Maud, and others.

Eagle district has a net-work of well-defined veins in granite.

Work is being done on the Wheal Anna, the vein of which shows a width of 4 feet and ore that will work up to $200.

Granite district.—The Oro is the only mine in this district which has been worked to any extent. The ore assays about $60 per ton, much of the rock showing free gold. Some work has also been done on the Summit adjoining the Oro, and a ledge of very fair ore has been uncovered.

Osceola district.—Work has been vigorously pushed on many of the mines in this camp, besides the expenditure of a large amount of money in developing the placer claims for the thorough working of which Messrs. Godbe & Hampton, of Salt Lake City, have commenced a system of water ditches that when completed will add largely to the value of mining property in the camp.

The Osceola Gravel Mining Company is a Utah incorporation. They

are constructing a canal some 16 miles long to convey the waters of five creeks to their placer grounds. The aggregate quantity of water furnished will be 1,000 miner's inches. An examination of the deep bars showed them to contain gravel varying in value from 45 cents to $1.25 per cubic yard. The unusual snows of last season furnished the means of using a small hydraulic, by which they washed from various places over 10,000 cubic yards of gravel.

The district is a net-work of quartz veins. The Cumberland, one of the pioneer claims, is a strong 6-foot vein and has a shaft 100 feet down. Forty tons of ore from this mine gave a result of $40 per ton.

The Osceola, owned by the same parties, has a shaft on the ore-body 130 feet. About 60 tons worked from this mine yielded about $37 per ton. The vein is 3 feet wide and pitches south at an angle of 70 degrees.

The Crescent and Eagle mines have workings to a depth of 300 feet and many tons of ore have been reduced showing $11 per ton.

The Saturday Night, a 4-foot vein, has no deep workings. Twenty-six tons of ore worked last fall yielded $80 per ton.

The Verde mine has yielded $34 per ton from a sample of 37 tons.

The Gilded Age has yielded over $40 per ton, mill process.

The Red Monster, owned by Pat Revey, has a shaft 100 feet. From this mine the owner washed out with a rocker, after screening the ore, $600 in less than 30 days, securing at the rate of $9 per ton and leaving about $20 in the quartz.

The Saturday Night, owned by Mr. B. Tilford, has a drift of 50 feet, and has turned out 75 tons of ore, 25 of which assorted yielded $82 per ton, mill process.

Shelbourne district—Although little work has been done on the mines in this district, some ore has been taken from the Northern Light giving returns of $200 per ton, but its average assays will not exceed $120 per ton in silver.

Surface rock from the Summit claim, adjoining the Northern Light, gives very favorable results.

Patterson district.—The mines of this district have been worked by only a small force of men. Some 40 tons of ore shipped to Frisco, Utah, for reduction, netted the shippers a fair profit over cost of shipping, extracting, and reducing.

The Gray Eagle mine is reported as containing rich ore.

Ward district.—The Martin White, Argus, Osceola, and Silver Cañon mines are the principal claims in this district.

The Martin White has been worked constantly during the year and good progress has been made in its development. According to the superintendent's report the explorations have been confined mainly to the southerly portion of the lead, a fair amount of ore of good grade being extracted. Snow so flooded a part of the mine that work was suspended. Prospecting was resumed on the 160-foot level in another part of the mine not affected by the water, and some good ore was extracted. The most of these developments were of a very encouraging nature. In all there was run during the year about 1,450 feet of drift 170 feet of raises, and 60 feet of shaft. About 250 tons of ore of the assay value of 41.32 ounces in silver per ton were extracted.

White Pine district.—Considerable work has been done on quite a number of mines in the district. The Eberhardt Company are still pushing the work with air drills upon their property, the Eberhardt and North Aurora mines.

At the north end of Treasure Hill the Sweetwater Mining Company have been operating during the past season with good results. They have

fourteen locations, the most important at present being the Stafford and Original Hidden Treasure. On the former the ledge is reported 30 feet wide and the best defined in this vicinity, with good foot and hanging walls, and an 8-foot dike of spar lying next to the foot-wall. The ore ranges from $50 to $60 per ton.

The Wheeler tunnel has been run 900 feet toward the Original Hidden Treasure, and a contract has been let to drive it 413 feet further, which will take it through the ground. The ore from this mine runs all the way from $25 upwards.

The yield from these two mines since the summer of 1883 has amounted to $73,350. The rock is a free-milling, silver-bearing ore with a mere trace of gold, and is reduced at the company's 20-stamp mill at Hamilton. The average yield is about $360 per ton.

The mill of the Ward Beecher Consolidated, better known perhaps as the Edgar mine, has been running on tailings for some time and has shipped nine bars of bullion, averaging .995 fine, and valued at about $10,000. About 10,000 tons of tailings remain on the ground to be worked.

The Consolidated Treasure has reached a depth of 115 feet, with ore of the same grade and character as that of the Edgar. Their water privileges are said to be by far the finest in the district.

The ore of the Jennie A. and Black Rock is base metal, averaging 43 per cent. lead and $40 per ton in silver, carrying some gold. The vein is a contact of quartzite and limestone.

The Silver Chamber shows a small vein from 1 to 19 inches in width. The rock is said to be rich, and a few men have been engaged in extracting ore with a view to shipping it.

The Hope mine, owned by Matthewson & Co., has been worked more or less during the year, and present prospects are said to be flattering.

The Chief is located on the north side of Treasure Hill. It is opened by a tunnel 300 feet in length, and one shaft 180 feet deep, showing an 80-foot ledge that will work by mill process $35 per ton.

The Continental Consolidated, comprising the C. O. D. and Fay, have been worked by tributers. The ore is base and works as high as $130 per ton.

The White Pine Belcher is looking well. One hundred tons shipped to Eureka worked up to $120 per ton.

The Konsberg has been prospected to a depth of 196 feet and about 100 feet in drifts, inclines, and winzes have been run. Ore taken from the mine to Eureka, Nev., gives returns of 1,620 ounces in silver.

Taylor district is located on the western slope of the Shelbourne range of mountains, at an altitude of 8,000 feet above the level of the sea and 500 feet above Steptoe Valley. Near the center of the district are located the Monitor and Gore mining claims, operated under the name of the Monitor Mill and Mining Company.

The Monitor has been worked since 1880 through two shafts each 57 feet deep. The ore-body has been found at a depth of from 40 to 60 feet, lying flat. Within the past three months, however, the ore-bodies uncovered have commenced to go down at an angle of about 30 degrees, the dip of the ore being south of west. The mill runs about eight months in the year. The total yield of the mine for the past year, reported by W. G. Lyons, superintendent and one of the owners, was 129,972.24 silver.

The Argus Mining Company have three claims, 4,500 feet in length, running parallel with the Monitor. The ore-chambers lie in a similar

shape and position and the rock is of the same character. Only c class is worked at their mill of 15 stamps, yielding from $50 to $60] ton. The principal work is being done on the Sunrise.

The Hayes, immediately south of the Monitor, has ore of the sa grade and character, a number of tons tested at Salt Lake giving cellent results.

The June mine, west of the Hayes, shipped 50 tons to the Argus m Some first class, previously worked at the Monitor, went upwards $300 to the ton. The Breechloader, on Chloride Mountain, 1½ mi north of the town of Taylor, is in a lime formation, with quartzite s and shale on the east. A 40-foot shaft shows an ore-vein 17 feet wi the gangue carrying the ore consisting of spar, quartz, and silici lime. A few tons reduced yielded $250 per ton, the lowest $102 a about $8 in gold.

A force of men have been at work on the Neptune for the Ar Company. In the shaft, a body of ore 8 feet wide is exposed, of a lo grade, but which will pay to mill. A road is being built to the mine.

Much prospecting has been done during the year but no discove of any importance have been made.

The assessors' returns state the production of the mines of this cou to have been as follows:

Name of mine.	Tons.	Valu
Argus	2,050	$49,9
Bay State	142	5,6
Monitor	2,295	76,9
Sunrise	1,200	23,7
Total	5,687	156,2

The following is Mr. Crawford's estimate of the yield of the State counties for the year 1884:

Counties.	Gold.	Silver.	Tot
Churchill	$10,000	$90,000	$10
Douglas	10,000	1,000	1
Elko	75,000	675,000	75
Esmeralda	65,000	35,000	10
Eureka	700,000	900,000	1,60
Humboldt	75,000	225,000	30
Lander	40,000	1,300,000	1,34
Lincoln	30,000	200,000	23
Lyon	100,000	250,000	35
Nye	10,000	65,000	7
Ormsby	8,000	7,000	1
Storey	1,800,000	1,200,000	3,00
White Pine	25,000	175,000	20
Washoe	12,000	3,000	1
Total	2,960,000	5,126,000	8,08

CHAPTER IX.

NEW MEXICO.

production of the precious metals in this Territory during the 884 shows a small increase over former years both in gold and due principally to an increase in the production of gold in the es of Grant, Lincoln, and Socorro, and a large increase in the pro- n of silver in the latter county. But little work, other than that ed by law to hold mining claims, has been done in many of the ts heretofore regarded as giving promise of successful mining op- is, while in the older, more extensive, and more advantageously l sections unusual energy and enterprise seem to have been it to bear in the prosecution of this industry. The celebrated Valley district of Sierra County is still in a prosperous condition, hstanding the fact that about a year ago most of its large-pro- ; mines were represented to be exhausted. From the nature of currence of the ore-bodies of this section, which are sometimes en- lisconnected, the rumor was not unreasonable. The explorations diamond drill have, however, thus far indicated with accuracy ation of new ore-strata, enabling the miner to ascertain the char- ind value of the ore-bodies with the minimum of underground cting.

incoln County prospecting is still carried on with energy and gence, but the production is reported from a few mines only, the on others having been prevented by want of necessary capital nsequent lack of reducing machinery, and in some instances by ting interests, resulting in vexatious litigation.

heavy output of Socorro County is largely due to the improved es afforded by the smelting plant at Socorro. The extension of anch of the Atchison, Topeka and Santa Fé Railroad to the Mag- s, some 30 miles west of Socorro, has done much towards bringing the prosperous condition of affairs of this county. It is reported is branch is to be continued westward to the Mogollons, in the ie western portion of the county, where is located the promising region known as the Cooney district.

Grant County the old mining camps of Georgetown, Silver City, e Rock, and many others have sustained their reputation as im- t mining centers. The extensive smelting plant at Silver City, ted over a year ago, is still in an unfinished condition. The enter- s, however, being energetically prosecuted, with a view to its early tion.

ge amounts of money have been disbursed in these districts in rk of developing mines, erecting mills and smelters, and in the nt of dividends, &c., showing that the industry has been pros- s and profitable.

e desultory work was done in the remaining counties of the Ter-

ritory, but without marked results. The great placer section of Santa Fé still attracts considerable attention, and efforts to secure the gold in its wonderful deposits are being made by a few enterprising individuals and wealthy corporations. If successful, the vast fields are sufficiently rich to amply repay the trouble and expense heretofore incurred.

I have estimated the production of the Territory for the year at, gold, $300,000; silver, $3,000,000; total, $3,300,000; distributed among the counties as follows:

Counties.	Gold.	Silver.	Total.
Colfax	$50,000	.....	$50,000
Doña Aña	5,000	$45,000	50,000
Grant	105,000	1,065,000	1,170,000
Lincoln	40,000	.....	40,000
Santa Fé	14,000	.....	14,000
Sierra	19,000	1,290,000	1,309,000
Socorro	67,000	600,000	667,000
Total	300,000	3,000,000	3,300,000

BERNALILLO COUNTY.

No bullion has been produced in this county during the calendar year 1884. In fact, very little work of any kind has been done in connection with mining interests. This was due in a measure to financial depression, but more largely to the fact that the ores produced by the mines are not sufficiently valuable to warrant treatment at present expensive rates or to ship for reduction to other points.

COLFAX COUNTY.

The placers of this county have been advantageously worked during the year, owing to the unusually heavy snow and rain falls of the pervious winter. The claims in the vicinity of Elizabethtown owned by Lynch & Robinson are reported to have been especially productive. It is stated that they yielded not less than $5,000 per month during the busy working season. Messrs. Ritchie, Lowrey, and others have pushed operations on their claims, and the general opinion is that the season of 1884 has been one of profit.

The Ute Creek, Willow Gulch, and Last Chance placer beds have also been worked successfully. In fact, every claim was worked to the fullest extent during the continuance of the water supply. Many of the lode mines of the various districts had some work done upon them, and a number of them give promise of future profit.

I estimate the production of the county for the year to have been about $50,000 gold.

DOÑA AÑA.

During the year the northwestern portion of this county, including the important mining sections of Lake Valley and Hillsborough, was organized, with other portions of Grant and Socorro Counties, into a new county, "Sierra," leaving Organ Mountain the only important district remaining in the county. The smelter at Organ has been completed and in operation at intervals since last March. While the ores treated were not what are generally termed refractory, some difficulty was at first experienced in their treatment. The smelter is a water-

jacket copper furnace of 30 tons capacity. It was erected especially to reduce the ores of the Memphis mine, which run high in copper and carry silver in considerable quantity. Latest reports represent the output of copper matte at about 30 tons per week, and that the silver contained runs from $100 to $200 per ton in value. Many of the other mines in this as well as the other districts on the opposite side of the range contain similar ores, which doubtless require the proper admixture to secure the best smelting results. The mining town of Organ is some 18 miles from Las Cruces, the nearest railroad point for supplying the smelter with the coal and coke required in its operations. It is true that the natural road to the station is excellent, but the consumption and cost of fuel is a large item and the expense of transportation a serious obstacle. There would seem to be no difficulty in securing the necessary ore to keep the smelter constantly supplied, as the Memphis, the company's own mine, is believed to be able to supply about 30 tons per day. From some cause, however, the output of the mine has not been kept up to this point. Some of its workings were submerged by water, notwithstanding it was represented to be furnished with superior steam pumping and hoisting works. More recent reports show that additional pumping capacity has been supplied, and that the mine is in condition to be worked in all its levels.

No works have yet been erected for the treatment of the silver ores of this extensive mineral section, although a galena smelter and stamp-mill are under contemplation.

The Silver Gem, Silver Girdle, Merrimac, Toughnut, Gray Eagle, Little Buck, Black Prince, and many others are producing mines of the section tributary to Organ City. The ores generally carry silver, and some of them gold also, in paying quantities. But few details as to their development during the year have been furnished, further than that they are being worked and have made shipments of ore.

A number of comparatively recent discoveries in Galloway Gulch have been actively prospected and developed during the year, under the superintendency of J. S. Crawford. So far as development has progressed the ledges are said to open up well. The ore is an argentiferous galena, running from 20 per cent. upwards in lead and quite high in silver; some also run well in copper. The lower or second-class ores from the mines of this camp will supply lead for fluxing purposes, much needed by the smelter at Organ City. The following are the prospects upon which the principal development thus far has been made: The Cañon City, Ludlow, Ohio, Scotia, Highland Chief, Hawkeye, Sandusky, Cleveland No. 2, Humboldt, Back Pay lode, &c.

Reports from Bear Mountain indicate considerable work done upon the various claims, but no reports of shipments or details of development have been furnished.

The same remark is true of *Jarrilla district*. From the best information attainable I place the production of silver at $45,000, and of gold, approximately, $5,000.

GRANT COUNTY.

The mining districts and mines immediately tributary to Silver City, the county seat of Grant County, have not, except in a few instances, been as actively operated during the year as in former years, and the result is the output has not increased, as was confidently expected.

The best producing mines of *Chloride Flat* and *Silver Flat districts* continue to be the Breman or "76," Sherman and Two Ikes. Others of considerable promise have been worked during the year, but not to

the same extent nor so systematically. The aggregate production o these districts for the year cannot fall short of $175,000, the bulk o which was from the Breman. The mill connected with this mine is re ported to be in excellent condition and successful in its operations notwithstanding the somewhat refractory nature of the ores treated. Some improvements in the way of leaching machinery have been added, with a view to treating an accumulation of some 7,000 or 8,000 tons of tailings of the old mill, which it is supposed will pay handsomely.

The Sherman mine has given employment to 5 men during the year, and its daily production is reported at from 4 to 5 tons of good grade ore. The ledge is about 6 feet wide and the vein-matter carries considerable horn silver. A quantity of ore has been shipped and its dump is constantly being increased. The developments of the year are said to indicate that this mine will be a steady producer. Its ores are chloride and gray carbonate.

The Two Ikes is worked by a force of from 12 to 15 miners and has been an extensive shipper during the year. Returns are reported of something over 100 ounces in silver to the ton. The company proposes continuing its shipments until the new sampling and reduction works are completed.

The Emma and Hidden Treasure are said to show up unusually well. Considerable ore has been uncovered, but left in place until the completion of reduction works. The work of exploitation is carried on by the aid of an Ingersol steam-drill.

Development on the Climax shows a vein of from 2 to 3½ feet of sulphurets and galena, which is said to give high assays. The vein is between well-defined walls of porphyry and syenite, and has the appearance of permanency.

The Little Chloride, with but slight development, is reported to show a fine vein of chlorides and gray copper, which gives assays of upwards of $400 in silver and 20 per cent. of copper. Work is being pushed energetically.

The Little and Big Colorado are also comparatively new discoveries. The ledge upon which they are located is said to be large and sample assays to run very high. The average is put at about $40 to the ton.

A new discovery is reported upon the surface of the Back Bone, which in a short time produced about 15 tons of high grade ore, without any indication that the ore-body was exhausted. These developments demonstrate the fact that even within a few miles of so important a place as Silver City there is still a promising field for the prospector in this the oldest mining section of the Territory.

A new smelting furnace is being built at Silver City, which is expected to be put in blast early in the year. It is intended especially to treat the low grade copper ores of the district of Santa Rita, San José, and Hanover. The capacity of the works will be from 10 to 12 tons daily; but should a demand for greater capacity arise, the managers of the enterprise will add stacks as they become necessary. The furnace will be an improved McNair gas reverberatory, similar to those in use at the Argo works at Denver. The fuel, instead of being piled in grates and subjected to direct incineration, is placed in heated muffles, by which all the gases are extracted. These are consumed in the furnace itself and in contact with the charge to be smelted, and it is estimated that a saving of 50 per cent. in this important item of expense is effected by the process. The furnace is not an experiment, so that the success of the enterprise may be regarded as assured if a sufficient quantity of ore can be found to keep it supplied.

ar Mountain district.—The Old Man mine of Fleming, in the northern
on of this district, has continued a steady producer throughout the
From 40 to 50 men have been kept almost constantly employed
e various workings. The shipments have been from 10 to 15 tons
ay. This does not include many thousand tons of low-grade ores
nulated on its dumps, which, when works are erected for their treat-
, as contemplated, it is said will net $20 per ton.
proved steam hoisting and pumping works have been purchased
rill be put in place at an earl\ day. The company at present
ıg and operating this mine has only had possession some six months,
as paid a dividend of $40,000. The returns received from shipments
a little over $90,000 during the year, which would indicate the ex-
ı of mining to be inconsiderable. This is largely due to the fact
the ore was found in large bodies or chimneys, and its extraction
ıot accompanied, in consequence, by any unusual amount of dead
. The seam or vein is said to vary from 10 to 30 feet in thickness,
s found on both sides of a ridge which traverses it. The ore and
ıanner of its occurrence being similar to that in the "76" mine,
Silver City, it is believed by many that the same ledge continues
gh both mines.
e Thayer Crowley mine, near Bear Mountain, has shipped some ore
g the year, principally derived from prospect shafts sunk on the
. A new shaft has been sunk, with the hope that, when it reaches
ontact, it will open up a well-defined vein. This is to be used as
'king shaft for systematic development.
on the Black Prince considerable work has also been done. The
shaft is down about 80 feet, and, though the seam was at first pock-
ı good vein was at last found, but no shipments were reported.
ork on the Rob Roy, of the Penrose group, has been pushed forward
energy, and some very fine ore exposed.
e Burro mine was considerably developed during the year, and
s a vein 2 feet in width, the ore from which is reported to have given
s of several hundred dollars to the ton.
the Carbon mine, near Fleming, 6 men have been at work upon, as
ted, a rich vein of mineral. Some difficulty was encountered from
ccumulation of water, but arrangements being made for pumping
nable the work of development to be carried on without that hin-
ıce.
ıos Altos district.—The two mills of this district were in operation
a part of the year, that of the Pinos Altos Gold and Silver Mining
pany having shut down about the 1st of October by reason of scar-
ıf water, and the Wagner mill on account of bad roads. The Pinos
s company's mill is represented to have sufficient ore on the dumps
in sight to supply it for several years. It has also from 4,000 to
tons of tailings, estimated to be worth from $60,000 to $80,000.
e are treated in connection with ore, in the proportion of a ton of
ings" to 2 tons of ore. The mill has a battery of 10 stamps, and
d to be complete in all its appliances for the treatment and saving
ıld.
e Wagner mill has a battery of 5 stamps and is capable of treat-
rom 8 to 10 tons of ore per day.
e year's development has done much to improve the Atlantic mine,
h is reported to be in excellent condition. The ledge has four
ıct veins of paying ore, one of which, 4 inches in width, assaying
n gold to the ton, was uncovered in the progress of the year's op-
ons. This is one of the old mines and has produced many thou-

sands of dollars' worth of bullion. Arrangements for extensive wor ings have been perfected and a heavier output may reasonably be e pected.

Some shipments of ore were made from the Alpha and Omega, b the returns having been unsatisfactory the owners concluded to redu their own ore by means of reverberatory furnaces. The work of dev opment on these claims has disclosed other rich bodies of carbonat and galena ores.

A number of other mines of the district have yielded considerable o during the year, and some gold was obtained from the placers, but t production was not large and was the result principally of Mexica labor.

In July last a discovery which may prove valuable was made abou a mile south of Pinos Altos, at the head of Arroya Questa. The vein a the surface is about 14 inches wide, and is said to carry some gold an assay 75 ounces of silver to the ton. Twenty pounds of picked or were smelted and the yield was reported to have been $23.50. Othe claims have been located and the same class of ore found, but develop ments have not been sufficiently extensive on any of them to warrant an opinion as to the probable value of the discovery.

Telegraph district.—In this district work has been prosecuted during the greater portion of the year. The Gila River and Telegraph Mount ain Mining Company especially has accomplished considerable develop ment work in their mines and shipped many tons of ore. Work in the district was obstructed somewhat during the year by a rise in the Gila River washing out a portion of the wagon road, but this was quickly repaired, and a portion of a new road was built to facilitate communi cation with the mines. The ore is transported by teams to Silver City, and there shipped by rail. It is of high grade and said to give profita ble returns.

The Mother lode, the property of the above company, shows a 4-foot breast of ore in the workings, claimed to average 41 ounces in silver per ton. A tunnel driven in upwards of 50 feet on the ledge of the Te cumseh, also the property of the above company, uncovered a vein of ore having at that point a width of from 2 to 2½ feet of ore, said to assay from 210 to 250 ounces per ton.

Steeple Rock district.—Much work was done in this district, especially upon the Carlisle, which continues to be the most important mine New steam hoisting and pumping machinery of sufficient capacity to carry on work to a depth of about 750 feet has been supplied during the year, and a smelting plant, with roaster and chlorina tion works, capable of reducing 20 tons of ore per day, has also been added. It was intended that these works should be in operation by September 1, but unavoidable delays prevented their completion at that time. The company owning this mine has expended upwards of $300,000 in improvements and in erecting necessary buildings, including a 20 stamp mill and the works above mentioned. Upwards of 200 men are kept constantly employed in and about the mine and mill and in cut ting and hauling wood. Water in sufficient quantity is obtained from the mine itself, and from a natural reservoir, improved by an em bankment, some 500 feet from the mill site. The principal shaft of the mine has attained a depth of about 450 feet. It is regularly opened by drifts, levels, &c., and the daily production of ore is about 40 tons although this quantity could be increased. While portions of the ore give high assays, the average value is reported at about $30 per ton, 2

to 30 per cent. of which is silver. In character it is a combination of free gold, fine quartz, and sulphurets. The vein-matter is heavy and carries considerable arsenic, which renders the ore somewhat refractory, but the appliances for saving the metal are so complete that the ore is treated with the minimum of loss. With the completion of the new works the bullion output may be doubled during the calendar year 1885, as there is a large accumulation of concentrates on hand.

Aside from the mines owned by the Carlisle Company there are a number of other good properties in the district, but none that are supplied with reduction works or equipped with steam hoisting machinery.

The Pennsylvania, adjoining the Carlisle, has been worked to some extent during the year and shipped some fine high-grade ore. It has recently been bonded for $20,000. Work on the Rain-in-the-Face has also progressed, showing up a fine ore-body. The west shaft is 75 feet in depth, and in ore the entire distance. The vein varies from 2 to 3 feet in width and averages about $40 in value to the ton in gold and silver. Over 300 feet of development, consisting of drifts, levels, &c., have been done. Considerable ore of good grade has been taken out and shipped during the progress of this work. This mine is regarded as a promising property.

On the Nugget a vertical shaft was expected to reach the ore-body at a depth of 200 feet, which depth was attained before the end of the year.

The Little Emily's shaft has reached a depth of 100 feet, showing a strong vein. A level has been driven, at 100 feet, a distance of 80 feet, all in ore of good grade. The vein is from 6 to 8 feet in width, and it is said gives mill-runs of from $20 to $25 per ton in gold and silver.

Work on the Turk mine is also reported to have progressed during the year, showing up a very large vein, said to be 26 feet in width, which gives assay returns of from $12 to $15 per ton.

The Missing Link has a shaft 25 feet in depth, exposing a fine body of ore, the width of which has not been determined. This mine adjoins the Turk and the vein is supposed to be the same.

The Mitchell and Norman mines have not been operated during the year to any considerable extent. They are both reported to be promising properties. The stoppage of work in the Mitchell was occasioned by the death of one of its owners.

An important strike is reported from a development in the vicinity of the Carlisle, but whether in a new prospect or an old working is not stated. The ore-body encountered is said to appear in a sandstone formation and to be extensive.

Bullard's Peak district.—The Black Hawk, one of the mines of the Solid Silver Mining Company, has been operated during the year, but not so extensively as formerly. The works have attained a depth of over 500 feet, seven levels have been opened, the last at a depth of 500 feet, and good ore has been found in all of them. The levels, drifts, &c., aggregate about 1,300 feet in length. Ores encountered are reported to have been left in place, the work since its discovery having been done principally for development. Unusually rich strikes of what seem to be large ore-bodies are reported to have been made at a comparatively recent date in the fourth, fifth, sixth, and seventh levels. Water is found in the different workings in sufficient quantities to supply all the machinery. The management of the company is said to have changed about the middle of the year, since which the output of the mine is reported to have been satisfactory. Some work has been done during the year upon

the following mines: Duncan, Grey Eagle, Rose, and Good Hope, a upon the latter some rich ore, consisting of native silver and arge tite, has been encountered. The mine is opened by a working shaft by 8 feet, which is being timbered in a thorough manner. The wor is said to be progressing steadily, but no particulars are given as to t depth of the shaft or what other development has been made; t prospects are, however, reported as encouraging.

The Duncan mine shows two veins, from 6 to 8 inches in width, rich silver glance, but the work thus far done has not been sufficient demonstrate the richness of the strike or its permanency, though t party prosecuting it is very hopeful.

The Grey Eagle and Rose are both reported to be promising prospe but neither has been worked to any great extent, owing to litigat between contending claimants. Excitement was created about a y ago by the discovery of native silver upon the Grey Eagle, and Rose, discovered about the same time, is claimed to have shown richest surface indications in the district, though it has had little w done upon it, as its legal troubles commenced about the same time.

Hanover Gulch district.—The Mollie S. group of mines has been worked under lease during a portion of the year by a considerable force of men. The ores were shipped to the Deming smelter for reduction. The ore-body is large, but the quantity of silver carried is not sufficient to warrant its shipment to distant points. The property has been in litigation for several years, and this is the first work of importance done upon it during that time. The smelter at Deming, after having been in operation for several months, was compelled to shut down in September, owing to a scarcity of wet ores.

Cook's Peak district.—The ores from this district are smelting, running about 40 per cent. in lead and from 10 to 12 ounces in silver. While the smelter at Deming was in operation a convenient market for this ore was afforded, but since it was closed down shipments have been made to more distant points.

The Montezuma and Graphic are the principal mines of the district. The latter supplied the Keystone smelter during the year with considerable ore, which, in addition to the minerals contained, was found to be very valuable as a flux. Considerable quantities were also shipped in sacks to the smelter at Socorro. While the value given shows the average character of the ore of these mines, pockets and seams are frequently encountered where the ore runs much higher; the Socorro shipments were of this latter grade and gave satisfactory returns. It cannot be said that the mining industry has been especially prosperous in this or the preceding district during the year. The development has, however, shown that the ore-bodies, though of low grade, are extensive.

Georgetown district.—Owing to the fact that the principal property of this district was closed more than half the year, the production has not been equal to that anticipated from the production of previous years. The Mimbres Mining Company's mill was compelled to shut down until August, and but little was done in the mines of the company during the time of suspension. During the latter half of the year, however, the mill was run profitably under the new management, and its mines have been worked successfully under lease. Upwards of 200 men are employed in the Naiad Queen alone, and a large surplus of ore is reported on its dump and in the bins at the mill. The daily production under the new leasing arrangement of working the company's mines is said to be more than sufficient to supply the mill when operated at its ful

capacity. This has not been the case under the present company, as, for economical purposes, it has only been run on three-fourths time. From the fact that the first fifty days' operations resulted in a bullion output of about $60,000, including concentrations, the outlook for the future seems especially promising for the leasing company.

The McGregor Brothers have pushed work on their property with energy during the year. A 5-stamp concentrating mill was erected by them and put in operation about July 1, since which time it is said to have been kept running day and night. About ten miners are kept constantly employed. Altogether the output of the mine and operations of the mill have been satisfactory.

The development of the Commercial mine has been actively prosecuted during the past year, and the result has not only largely increased its output, but so opened ledges and ore-bodies as to demonstrate their extent and value. From 20 to 30 miners are employed, and the output per month is from 2 to 4 car-loads of shipping ore that is reported to give returns of over 300 ounces of silver to the ton. The ore is sent to the Billings smelter at Socorro, a distance of 125 miles by railroad and 25 miles by wagon; hence none that runs less than 50 ounces to the ton is shipped. The consequence is that there is quite an accumulation on the dump of the mine of ore of this and lower grade, which will be concentrated before shipment. A new incline shaft was started during the year, which penetrates the mountain at an angle of 34°, and which is expected to strike the mineral deposit at a depth of 300 feet. This shaft is to be a double compartment and thoroughly timbered. It is fitted with a 12 horse-power steam-hoist, recently completed. At last accounts the shaft had attained a depth of nearly 200 feet. With the striking of mineral in this incline a largely increased output is anticipated. Upon the whole, the mining industry of this district is reported at the close of the year to have a prosperous outlook for the year 1885.

Burro Mountain district.—But little of note has been reported from the district, and nothing of consequence was done in the way of exploitation in either of the subdistricts or camps of Oak Grove, Sulphuret City, or Paschal, which heretofore have been the mining centers. This, doubtless, results from the discovery, early in the year, of reported rich deposits still further to the south and west of Silver City. The smelter at Oak Grove has been dismantled, and such portions of the building and machinery as could be utilized have been transported to Silver City, where they will become part of the new smelting plant in process of erection there.

Gold Gulch district lies to the south and west of the Burros and embraces an extensive area, of which the boundaries are as follows: Commencing at a point about 14 miles northeast of Lordsburg, the southern line extends west to Flat Mountain, 25 miles; thence northeast to Round Top Mountain, 20 miles; thence east and southeast to the point of beginning. Malone, Gold Hill, Thompson's Cañon, and Gold Gulch are the principal camps. In the first are eighteen mines that will furnish ore from the surface, increasing in richness as depth is gained. The ledges are reported to be unusually wide and the ores to run high in gold and silver.

The Young Man mine seems to be the most promising, and its ledge is said to show immense outcroppings, in places about 40 feet in width. Two openings have been made, both in excellent ore, every portion of which is mineral in the form of native, sulphide or horn silver. An assorted lot of 14 tons was shipped to the smelter at Socorro, and returns

of $275 per ton were received. Although one of the first locations [illegible] little work has been done upon this property by reason of the fact that it was claimed by two different parties. The matter has been settled however, and the mine is reported to have been bonded for four months by a California company.

Many other locations made in the vicinity of Gold Hill are being developed energetically. The same character of ore is found in nearly all, and the owners of at least a dozen have shipped in car-load lots, and others are sacking and making arrangements for shipping the better grade of ore. Prospecting continues active.

The latest discovery was made in the neighborhood of Soldier's Farewell. The outcroppings show ledges from 10 to 40 feet in width, and assays have been had of over $50 in gold and silver. The ore is said to contain more gold than silver; in fact, free gold is reported to have been found. The place is 12 miles from Lordsburg by good roads, and as the ore is easily mined the expense of getting it to the railroad will be but trifling. This new camp is well supplied with wood, but the scarcity of water is a great drawback, as it has to be hauled from 10 to 12 miles. Arrangements have been made to meet the want by sinking wells, and it is hoped that a plentiful supply may thus be obtained. The excitement attending this discovery almost depopulated for a time the other camps of the district, and extended even to Lordsburg and Silver City. It is reported that good wages can be made by pounding the rock and washing out the free gold by hand. The placers in this district were worked to some extent during the spring months and yielded considerable gold. It has long been known that Thompson's Cañon and Gold Gulch contained gold, but want of water in quantity prevented their being worked heretofore. The yield was not large, but the work demonstrated that gold in paying quantities exists.

Victoria district.—This district has been the scene of active operations during the year. The principal mines worked were the Chance and Victoria. The latter was idle during 1883, because it could not be worked profitably. Under a new management, however, work was begun about the first of the year, and in less than six months a profit, as reported, of $40,000 was realized. The ore is a carbonate of from $40 to $50 per ton in value. It lies in large deposits or chimneys and is very easily mined, but the work of development and exploitation is tedious and expensive, owing to the hard character of the limestone rock in which the deposits occur. The labor of penetrating this difficult formation is compensated by the fact that no expense need afterward be incurred in timbering shafts or drifts. Discoveries of large ore-bodies during the latter part of the year 1884 are reported, and the prospects for permanency are much better than at any former period.

The Chance mine is immediately south of and on the same ledge as the Victoria. Their ore and the occurrence of their ore-bodies are identical, except that the Chance has two apparently well-defined ore-channels. Work upon this mine during six months or more has been for exploration, and many ore-bodies have been encountered. The ore, however, was of lower grade than usual, and the shipments have little more than paid the expense of operating. Lately, however, an unusually fine deposit was uncovered, which promises well. It is, of course, a carbonate, and of a character very much desired by smelters for fluxing, and is said to run high in silver.

The Arizona has also come to the front during the year as a bullion producer, and is reported to have shipped daily 12 tons of ore.

Shipments from the Chance mine to the Benson smelter during the

ast year have amounted to some 4,000 tons, and its dump is said to ontain several thousand tons more, the greater portion of which can be rofitably shipped. The production of the Victoria was shipped to So-orro for treatment.

Pyramid and Shakespeare districts.—But little was done in these dis-ricts during the year, and no operations of the 20-stamp mill owned by he company have been reported.

The Last Chance was compelled to suspend operations in the early art of the year, but in the latter portion its indebtedness had been ettled, with the exception of a few amounts involved in litigation. The res of these districts are good and in considerable quantity, but of oo low grade to pay the heavy expenses of shipment and leave much rofit. When the mill was erected it was soon found that the major ortion of the ore required smelting, and the result is the mill proved failure.

Tres Hermanos district.—The most important mines of this district till are the Cincinnati, Yellow Jacket, Chance, and Hancock, but they ave not been worked extensively during the year. The other proper-ies of the camp generally belong to men without capital to develop hem. The mines have shipped some hundreds of tons of ore that is aid to have been worth about $75 to the ton. Generally the ore is a hloride, in a more or less decomposed gangue of silicious iron. During he year a reverberatory furnace was erected to treat the ore, but was ot completed in time to prove whether with profit or not. The fur-ace is of the serpentine pattern, so much and so successfully in use in he mining sections of old Mexico.

Eureka district.—Operations in this district during the year were not ushed energetically and the work was apparently unprofitable.

The enterprising owners of the King mine resolved to sink their working shaft to a depth of 500 feet, but work was suspended in Octo-ber, when a depth of over 400 feet had been reached, and the shaft is reported to have nearly 200 feet of water in it. No ore was taken out of the shaft, and at a depth of 200 feet the vein, which was nowhere more than from 1 to 3 feet in width, entirely pinched out. It was to ascer-tain whether the vein would reappear at greater depth that the work was prosecuted.

The mines of Dug Cut camp have been worked considerably and open up promisingly. The Lucky is opened by a number of shafts, all showing ore, some of high grade. One car-load is reported to have milled $300 to the ton. After shipping the choice grade the remainder is said to be free milling and to yield from 40 to 50 ounces to the ton.

The Capitan, Lone Cedar, Black Metallic, and Shorty have all been more or less worked and have produced good ore. They are opened by shafts varying from 25 to 50 feet in depth. Water is abundant.

Apache district.—This district lies some 12 miles southeast of Eureka and east of the Hacheta Mountains. Several rich strikes are reported to have been made during the year.

The most important claim, in point of development, is the Daisy, the working shaft of which is down about 50 feet, all in ore—a carbonate, plentifully mixed with chloride. Some 500 feet of the vein have been exposed by the various workings, and the ore-body is thought to be ex-tensive. The formation is limestone and the surface out-croppings are traceable for a distance of 1,500 or 1,800 feet.

The Dandy, another location on the same ledge, adjoins the Daisy. A shaft some 20 feet in depth shows ores possessing the same general characteristics. One shipment is said to have given a net return of $111 to the ton.

McKee & Downy are also developing a ledge which carries a vein from 2 to 4 feet in width. Assays run from 70 to 300 ounces silver to the ton. A shipment of one car-load has been reported.

Monument district.—Considerable work was done during the year upon the locations in this district. The vein is said to extend the entire length of the district, in a contact of lime and porphyry.

The principal developments are the U. S. Treasury, New Mexico, Last Chance, and Sub-Treasury.

A 75-foot shaft on the U. S. Treasury shows the vein to be about 70 feet wide, including its spurs. The ore is a heavy galena, averaging about 50 ounces of silver to the ton. As depth is gained the grade improves. The ore of the New Mexico is also a high-grade lead carbonate. The ore-body, however, is small. The development consists of a shaft 50 feet in depth, all in vein-matter.

The Last Chance is a fractional claim, running about 750 feet to the boundary line of old Mexico. The ore is a sulphuret, carrying galena. A cross-cut of some 40 feet shows unusual width of ore-body.

The Sub-Treasury runs into Mexico. It is opened by shaft to a depth of over 80 feet, upon a heavy vein of lead and iron. The Mexicans have done considerable work upon this claim, shipping quite a quantity of ore to the city of Mexico.

Florida district.—The Silver Cave is the only mine of this district from which any report has been received. It is represented to have been worked with regularity, and to have shipped the ore produced to Deming for treatment.

The silver production of Grant County for the year was about $1,065,000, coining value, and of gold $105,000.

LINCOLN COUNTY.

Of the old mines of *White Oaks district* the Homestake seems to be the only one upon which much more than assessment work has been done. The following letter from D. J. M. A. Jewett, esq., shows that the old difficulty, want of adequate machinery for reduction, retards its more active development. He says:

"I inclose all the report of the bullion production of Lincoln County in 1884 I can give. A dozen properties have been concerned in the gold production. I can say that the chief producer has been the American mine, in Dry Gulch, two miles south of this place. This mine and the mill on the property are managed by the sole owner, William Gill. The lode is nearly 60 feet between granite walls. All of this is pay-rock, but the milling has been mainly confined to selected rock, the mill being very small (two tons in twelve hours), and the rich rock easily obtainable. Mr. Gill intends erecting a large mill shortly. The product of the mine has paid for its development, for its mill, and for two-thirds of itself bought in from other parties in 1884, from earnings.

"The next most important producer for 1884 is the old and well-known Homestake of White Oaks. After lying idle a long time it started up in September, under the careful business management of Col. T. W. Herman, of Saint Louis, superintendent of the company. It has become a heavy producer of $40-ore. Its present production is restricted to a fourth of its capacity on account of there being but one mill available for the treatment of its ores, and that an old and poor 10-stamp affair not extracting over 60 per cent. of the assay value. Even with these drawbacks, the mine is earning expenses, salaries, and development, and paying off old debts.

'The Delaware Gold Mill here, fitted with Tasker pulverizers, is being
odeled into a stamp-mill.
There are no reduction works in the county, and therefore no means
itilizing any silver ores unless of very high grade."
. report from the South Homestake, on Baxter Mountain, represents
; it is opening up promisingly, but the new strike made has not
1 sufficiently exploited to fully determine its extent and probable
ie. The ledge is reported to be nearly 40 feet in width, in all of
ch gold-bearing quartz was found that contains a lead of free gold
it 9 feet wide, assays from which gave $12 to the ton from the
:er quartz, while others, not including the free-gold deposits, ran as
1 as $55 and $65 to the ton.
ogal district.—In Dry Gulch is located the American mine, of which
Jewett writes: "This mine and the placers about a mile below in
same gulch have furnished the bulk of the production of the county
the year. The ledge is wide and strong, and the vein, so far as
ied up, shows a width of 12 feet of free-milling gold ore which is
to average about $80 to the ton in value. A narrow streak of
it 3 inches in width is represented to give very high assays."
:r. J. E. Sligh, of White Oaks, has kindly furnished the following
:ription of this district and of the most promising mineral prospects
)raced within its limits:
Nogal district includes about fifteen miles of the north end of the
ite Mountains and the Ticson Mountains, which lie about six miles
:heasterly from the northernmost point of the White Mountains.
The only vein of any value discovered in the Ticson Mountains is
Vera Cruz lode. On this there are several locations. No very ex-
sive development has been done on any of them, however, except
Vera Cruz mine. This claim shows a large body of low-grade free-
ing gold ore.
The vein is over 40 feet in width, with perfectly well-defined walls,
y exposed.
At first it was supposed that the ore was simply a deposit, but later
elopments prove beyond doubt that it is a true mineral vein. Un-
unately, this property is in the hands of a stock company without
ital sufficient to erect such machinery as will be necessary to make
mining and milling profitable. The average value of the ore is
ut the same as that of the Black Hills Homestake.
On the west side of the White Mountains in Nogal district are a
ıber of very flattering prospects. The ore in this locality is mostly
per glance, copper silver glance, bornite, and galena. All the ores
ar discovered show on analysis a small amount of gold, ranging in
ie from $5 to $20 per ton. The value in copper runs from 5 to 70
cent. Silver ranges from a few ounces to 2,500. Lead is insignifi-
t, not enough for fluxing purposes.
The mountain side is literally seamed and crossed by veins. A few
he most promising have been partially developed with good results.
copper glance at 60 feet in depth shows smooth walls and a mineral
ak of high-grade ore—bornite—about ten inches in width, averaging
0 per ton.
The Sugar Stake, at 67 feet in depth, shows perfect walls, and a
ma streak about 6 inches wide, which assays 70 ounces silver per
This is the only vein on the west side, so far discovered, that
ies no copper at all.

"The Silver King, or Red Chief, is a large vein, carrying copper, lead, and 50 ounces in silver.

"The Copper Matte shows high-grade copper glance ore, copper 70 per cent., silver 20 ounces per ton.

"Quite a number of other veins show good ore in varying quantities, but no large amount, owing to want of development. Fuel is abundant and cheap, water in sufficient quantities in several gulches. This camp is about 60 miles from Carthage, on the Atchison, Topeka and Santa Fé Railroad. White Oaks is the post-office and supply point. Development is proceeding as rapidly as possible, and during the present year we confidently anticipate a bullion output."

The production of Lincoln County during the year was $40,000 in gold. These figures are based on reports furnished by correspondents. The amount given, though an estimate, is believed to be a conservative one. The production of silver was so small as to be unworthy of notice. The want of proper facilities for the reduction of silver ores accounts for the meager output of that metal.

RIO ARRIBA COUNTY.

The Good Hope and Chama River placers have attracted considerable attention, and much work is reported to have been done upon them during the year. The Chama placers are principally owned and operated by Santa Fé parties. A ditch 3 miles in length has been constructed to secure an abundant water-supply; 8 or 10 men are employed under the supervision of an experienced Californian.

SANTA FÉ COUNTY.

Considerable activity, especially in placer mining, has been shown in this county during the year 1884, and much money has been expended in preparations for securing the rich gold deposits of the placers, as well as in the erection of reduction plants for the treatment of the production of the lode mines. The following description of the placer districts has been kindly furnished by W. N. Emmet, of Golden:

"*New Placer Mining district.*—This district embraces almost the entire southern portion of Santa Fé County. Its principal town and post-office is Golden.

"The attention of mining people of this section is at present turned toward 'placer mining.' Rich deposits have been discovered from which at least $10,000 in gold dust have been taken in the past nine months by about twenty-five miners with the old-time 'rocker' and 'pan.'

"The Davenport Exchange Mining Company have two artesian wells upon their grounds, the use of which, with proper machinery, or even the common 'sluice-box,' could be made to pay handsomely, but unsuitable machinery and lack of proper management almost rendered them valueless, as shown by report of bullion produced in 1884. The property is expected to change hands shortly, and under new management will show flattering reports for 1885.

"The Cincinnati Gold Mining Company is a new enterprise. The mill has only run about three weeks in all, but proves that the ores of the district will produce handsomely.

"The Tuerto stamp mill is a small 'plant' which has been in operation for about two weeks during the past year, showing good returns in that time.

"On the Tuerto Arroya, north of Golden, are the following large

acer-mining stock companies preparing for extensive operations in the ring:

"The Saint Louis and New Mexico Company, W. G. Fuller, superintendit, has put in a large dam and reservoir and made other extensive preparations for work as soon as the weather permits.

"The Chicago and New Mexico Company, Henry Rice, manager, has red an artesian well and built a large reservoir, and will soon be prepared to begin operations upon the rich placer property.

"The Golden City Placer Mining Company, W. N. Mason, superintendit, has also expended a large amount of money upon its placer grounds, d has recently purchased, at great expense, 15 miles of the pipe line the San Pedro and Cañon Del Agua Company to carry water from e Sandia Mountains to its grounds on the Tuerto, thereby showing at the grounds must be very rich to justify the expenditure of such amount of money to prepare for operations.

"The San Pedro and Cañon Del Agua Company's mine, 20-stamp mill, pper smelter, and furnace are still idle on account of an action brought the United States against said company to set aside a patent to some ,000 acres of public domain alleged to have been obtained through aud. The cause of the present condition of this section, its apparent ck of enterprise, and its slow progress are occasioned by these 'exnded surveys, formerly known as agricultural or pastoral land grants,' hich are now found to cover vast tracts of rich mineral lands.

"This section is very rich in copper, gold, and silver ores, and if the estion of title was settled it would be a flourishing mining camp, and e bullion product in 1885 would be surprising; but as it is the outok of this district is by no means discouraging."

In the operations of Mr. Mason, superintendent of the Golden City lacer Mining Company, a well 8 feet square was sunk 40 feet into the ale formation or bed-rock, which resulted in striking what seems to an inexhaustible supply of water. It is believed that the entire sin filled by the gravel deposits is a sort of invisible lake fed by the merous streams and springs from the mountains which seep through e gravel to the bed-rock; should this prove to be the case it would em that the water problem of this section is in a fair way to be solved. he Chicago and New Mexico Company have begun a similar well 10 et square, which it is proposed to sink to a depth of 100 feet. An rtesian well upon the ground of this company is down nearly 500 feet, e water in which rises to within 80 feet of the surface.

These companies are, in addition to washing and sluicing the gravel, aking arrangements to utilize the Bennett dry amalgamators, 5 of hich have already been contracted for by one of the companies. The achines are reported to do satisfactory work; indeed, it is claimed hat they save all the gold contained in the gravel operated upon. It s estimated that these gravel fields have an area of over 50 square miles, vith a depth of from 20 to 100 feet to bed-rock, and that their average will exceed rather than fall below $1 per cubic yard in value.

Pecos district.—Aside from the annual assessment work but little has been done during the year upon the mines of this district on account of troublesome lawsuits in which the owners have been involved. My correspondent, Mr. Cowles, secretary of the Pecos River Mining Company, however, writes that they will be extensively developed during the coming year. He says: "The property of the Pecos River Mining Company is composed of 5 full claims and interests in 3 others, the same being located at Hamilton, on the Pecos River, at its junction with Willow

Creek, 12 miles north of Pecos town, in San Miguel County, or rather the territory in dispute between Santa Fé and San Miguel Counties.

"Running across these 8 claims, the Victor Hugo, Katy Didn't, Katy Did, Evening Star, Evangeline, Maud Muller, Dan Deronda, and Silver Spar, is one of the grandest mineral veins in the United States. It is from 20 to 100 feet in width, and can be traced for several miles. It was only discovered in 1880 or 1881, and since that time upwards of thirty or forty thousand dollar's worth of prospect work has been done upon it, on the property of the Pecos River mines. The principal work done by this company has been on the Evangeline, Evening Star, and Katy Did claims. On the Evening Star a shaft has been sunk that penetrates 50 feet into a solid mass of ore containing not over 10 per cent. of gangue. At the depth of 40 feet a cross-cut has been run north and south 63 feet, and it is not certain that the walls of the vein have been reached yet on the north end, and the south end is still in ore. The mineral is a mixture of gold, silver, copper, lead, zinc, and nickel, all sulphides, and of course refractory. Some streaks are very rich in gold, silver and copper, and more again will go 50 per cent. of zinc.

"In the Evangeline mine a shaft 80 feet deep has been sunk, and 4 cross-cuts north and south driven 30 or 40 feet. All this work is likewise in ore of the same character as the Evening Star. The Evangeline and Evening Star shafts are 600 feet apart. A third shaft, half-way between them, has been sunk 40 feet, and is in gold-bearing iron ore, and a cross-cut at this point, 65 feet long, is entirely in vein stuff. The timber supply is unlimited. A thousand horse-power is running to waste directly at the mines. Coal, fire-clay, and limestone are found on this same group of claims, while the Pecos Valley, within 10 miles, contains an ample supply of cheap labor, as well as an abundance of agricultural products, all of which make possible the cheap reduction and mining of this great body of valuable ore."

The production of this county for the year is reported at about $14,000, all gold, principally from the placers.

SIERRA COUNTY.

During the year, this county was organized from portions of the northwestern part of Doña Aña, the northeastern part of Grant, and the southern portion of Socorro Counties. It embraces several of the most important mining camps in the Territory, including the Lake Valley and Hillsborough districts (formerly in Doña Aña), Kingston, taken from Grant, and the entire Black Range, to a point 10 miles north of Chloride. Containing rich mines, largely developed, the county at once takes rank among the others in the Territory as first in the production of precious metals. With the exception of Lake Valley, the mining sections are all isolated and remote from railroad communication. This will doubtless for some time retard their development. The Black Range portion of the county is especially rough and difficult of access. Notwithstanding the rugged aspect, the county is dotted with prosperous settlements, and occupied by a hardy and enterprising mining population, who will in time no doubt overcome these obstacles.

Lake Valley district.—This district still continues the most productive mineral section of the Territory. This is principally due to the energetic development of the Sierra Grande Company's system of mines, of which the Sierra Grande, Sierra Bella, and Apache are the best devel-

ıped, and consequently the largest producers. Work upon these as well ıs others of the district has been pushed for the greater portion of the ear, and in most of them new ore-bodies have been uncovered. A ranch of the Atchison, Topeka and Santa Fé Railroad was completed arly in the year to the principal dumps of the camp, thus enabling ıine-owners to profitably ship ores that heretofore have been of too ıw-grade to pay for wagon transportation. Large quantities of this ıw-grade ore have been shipped from the Apache to Pueblo, where is used for fluxing. The iron it contains makes it very valuable r this purpose. From 50 to 200 tons of the ore were shipped daily ıder a contract for 50,000 tons to be furnished the Pueblo smelting orks. In addition to this, the various mines of the district ship eekly from 100 to 150 tons of high-grade ore. During the months of ay and June shipments were materially interrupted by an unprece-ıted rise in the Rio Grande, which in many places submerged the ilroad, and in some instances washed away embankments and the ack itself. While the interruption produced no little embarrassment, reason of the delay and difficulty in obtaining supplies and returns ɔm ores mined and waiting shipment, the aggregate production was ıt affected, as the increased shipments during subsequent months al-ɔst made up the deficiency occasioned by the overflow.

The Sierra Grande Company has within the past two years paid in sh dividends about $1,000,000 to its stockholders, besides expending ımense sums in development and permanent improvements. Its ines are all supplied with the latest and best machinery for hoisting es and pumping purposes, though the works have not attained suffi-ɛnt depth to make water a serious obstacle. The three principal ines of the company have given almost constant employment to about 0 men throughout the year. Of these, about 170 are employed in the erra Grande, 70 in the Sierra Bella, and the remainder on the Apache. evelopment of the latter has not been pushed with the energy and ɛrseverance that have characterized the operations of the other two roperties; in fact, work upon it has been somewhat desultory, par-ally owing to the refractory character and low grade of much of its ore.

Kingston district.—Included in this section are all the mines located ı the several branches of the Percha west of Hillsborough. The ullion, Superior, and Iron King continue to be the principal producers, lthough the Brushheap, Solitaire, Illinois, Blackey, Monaska, Iron lad, Gray Eagle, Ingersol, Forest King, Caledonia, Lady Franklin, nd many others have been worked to some extent, and all are reported) have produced more or less bullion. The concentrating works at ingston have been in operation during the greater portion of the year. hese consist of four Imblay concentrating tables, which have a capacity f from 20 to 30 tons per day. In addition to these works the Iron King ompany's smelter, of some 60 tons capacity, erected at Kingston, was ı operation at intervals for about nine months of the year, although ome difficulty was experienced in securing the necessary lead ores for luxing. The developments of the year have, however, opened up everal large bodies of ore of the character needed, and the opera-ions of the smelter will, in consequence, doubtless prove more profita-le in the coming year.

The Bullion and Superior are, without doubt, the most important ines of this district; they are well supplied with steam hoisting and umping machinery, and are being regularly opened by drifts, levels, tc. The Superior has attained a depth of upwards of 300 feet, and the

principal work of development during the year was carried on at this and the 200-foot levels, some 20 men having been employed almost constantly.

The shaft-house and hoisting works of the Bullion are only a few yards from those of the Superior, and are equally complete in their appointments. These two mines employ about the same number of men, and their production is about equal. The depth attained in the workings is something over 200 feet, from which point levels and drifts are being run.

The Lady Franklin, located some 300 yards northwest of the Superior, is regarded as one of the most promising of this district, and yet only two or three men are kept employed. The ore is shipped to Socorro for reduction, and the returns are said to be sufficient to afford a satisfactory income to the three owners of the mine.

Of the other mines of the district that have shipped ores during the year, the Brushheap has been the most actively worked and has during a portion of the year made weekly shipments sufficient to net the owners about $5,000 per month. A good wagon-road has been made to the dump, which is reported to contain much good ore. The Brushheap is declared to be a very promising mine, and to rank next after the Lady Franklin. A large force of men is not employed, as a considerable surplus of ore had accumulated on the dump.

A good wagon-road has also recently been completed from Kingston to the Gray Horse and Illinois, both of which are shipping ore to the Kingston concentrating works. A small force is employed on each, but as returns are received from shipments other men are put to work. The Illinois is on the same contact with the Iron King.

The Miner's Dream, adjoining the Iron King, has been vigorously developed during the year, and is said to show large bodies of lead sulphides which carry from 10 to 100 ounces of silver to the ton.

The Eclipse is another large producer of lead carbonate smelting ore. It was bonded during the year to the Iron King Company. These are the properties which are largely depended upon to furnish the company's smelter with the lead ores necessary for fluxing.

In the extreme southern portion of the district lie the Monaska group of mines, which have been quite extensive producers of bullion. But little work was done in the latter portion of the year, owing to the death of one of the principal owners. Considerable work is reported in the way of improvements, and the building of a wagon-road as an outlet for the transportation of its ores to Lake Valley.

The Solitaire, some 5 miles north of Kingston, has been idle, or nearly so, during the year. This was due principally to litigation. This is the claim that gave promise of such unusual value by its surface indications, but whether these are not deceptive is yet to be demonstrated by development.

Of the other once promising properties, like the Brilliant and Morning Star, both adjoining the Solitaire, no report of development has been received; in fact, but little, if any, other than assessment work appears to have been done in this portion of the district.

Hillsborough district.—Little in the way of development has been done during the year; even the Bobtail, the best developed mine, was idle. This mine is furnished with fine steam hoisting and pumping works, as well as all necessary buildings. Development has proven it to be a promising mine, yet no improvements worth mentioning have been made upon the property.

The Bartleson 10-stamp mill was erected to treat the ores of the Bob-
il, but the loss in treatment, owing to inadequate machinery, was so
eat as to materially reduce the profits. During a portion of the year
e mill was running on ore supplied by the O'Kelly mine at Las Ani-
as Peak, which it is reported to have worked with less wastage.

The *Las Animas district*, some 10 or 12 miles northwest of Hillsbor-
gh, has latterly come into prominence as a rich gold-bearing region.
e gold is found in placers near the foot of Las Animas Peak, and quite
number of leads have been opened on the mountain itself, and in the
cinity. Of these the O'Kelly, north of and near the base of the peak
regarded as the most important. The main shaft has attained a depth
about 150 feet. The vein is not unusually large, but a gradual im-
ovement is reported as development progresses. Its richness may be
ferred from the fact that the ore, after being transported by teams to
illsborough for treatment, yields a handsome profit to the owners.

The Trip mine is another development of the district that gives prom-
e of becoming valuable. It lies about a mile west of the peak. The
me company that owns this prospect is also pushing work on a prom-
ing lode near the summit of the mountain. What amount of develop-
ent has been made or what the size of the ledge is upon which the
ork is being done is not stated. The company, however, employs
me twenty miners.

The Longstreet and Oro Fino are also reported as promising mines.
onsiderable was done upon them during the year, resulting in a rea-
nable output of ore rich enough to pay for transportation to the Hills-
orough mill for reduction.

The placer grounds in the vicinity are said to be extensive and rich,
t the want of water to wash the gravel is a serious hinderance to
ccessful operations. Good wages, however, are said to be made by
uling the dirt to the Animas on the north, or to the North Percha on
e south. Wells have also been dug from which sufficient water is ob-
ined to wash the gravel by the old-fashioned-rocker process. Not-
ithstanding the disadvantages, some miners occasionally realize large
ages, and four men are reported to have cleaned up about $5,000
two months. Some profitable work is also to be accomplished by
e arrastra process, the cement yielding from $25 to $35 per ton.

Apache district.—M. A. Chamberlin, of Chloride, Sierra County, has
ndly furnished an article on the mining outlook of Apache district,
hich contains the following information:

"The Silver Monument is a remarkable property and the only present
oducer in the camp. It is a true fissure in green and red porphyries.
e vein is nearly vertical, and from 4 to 12 feet in width. It seems to
a double mine—the ore streak on both walls, the intermediate gangue
ing porphyry filled with copper and iron pyrites which would pay for
ncentration. A shaft is sunk on the lead to the depth of 216 feet, from
hich two levels are run at a depth of 100 and 200 feet, respectively. A
eat deal of useless work was done on this mine prior to its present
rnership. Now it has improved steam hoisting works, and a force of
n to fifteen men are constantly at work taking out ore that runs from
.75 to $400 per ton in carload lots. The ore is of the bornite variety
d very handsome in its variegated colors, often showing native silver.
n the walls of the mine is the talc 'slickensides,' from 1 to 3 inches
thickness, of putty-like consistency. For its true fissure character
d the uniform regularity of its strike it is quite a study.

"The Monument will take high rank in the future as a producer of sil-

ver. Its ore, being of the bornite variety, runs from 15 to 25 per cent. copper, and with greater depth increases in grade."

Mr. Chamberlin also mentions the following properties as in a forward condition of development, though not, however, producing during the year: The Buffon, Colossal, Midnight, White Signal, Dreadnaught, and Silver Glance. They are described as true fissures, and the ore encountered in them as similar in character to that of the Silver Monument, but in most instances of lower grade.

In addition, he mentions the Black Knight, Apaché, Wall Street, Adirondack, Tidal Wave, King Nos. 1 and 2, Black Prince, Sunrise, Hancock, and U. S. Treasury as promising claims.

A survey has been run to Chloride by the Atchison, Topeka and Santa Fé Railroad, and the building of a branch road is promised when the district can produce five carloads of ore per day.

The production of silver at coining rate was about $1,290,000; and of gold, estimated, about $19,000.

SOCORRO COUNTY.

Mining operations in Socorro County were pushed more vigorously during the year than in any previous period of its history. This was especially the case in the extreme western portion or *Cooney district*, and at and in the vicinity of Socorro. The result has been to increase largely the production of the county and to demonstrate the permanency of the ore deposits.

Cooney district.—This district, lying remote from railroad communication, has nevertheless been the scene of active and successful operations, as will be seen from the following description furnished by Capt. M. Cooney, an old resident and prospector of this section and superintendent of one of the principal companies engaged in mining operations:

"During the year this district has made some progress in the way of development. Silver Bar Mining Company has run a tunnel 250 feet, with the object of tapping the lead at a depth of 500 feet and pushing a shaft on the lead, which dumps very fine gray copper and silver glance.

"Silver Bar No. 1, northwest extension of the Cooney mine, is the property of the Peacock Mining Company. Very little had been done upon it for several years until September, 1884, when a force of men was employed in sinking upon the ore-bodies, which steadily improved in quantity and quality as the work progressed. The output for 1884 will not fall short of $4,000.

"On Silver Creek the Smuggler mine has been developed to the extent of 100 feet during the year and about 12 tons of ore, valued at $1,500, have been shipped from the dump to Argo.

"The Silver Hill Mining Company has during the year been continuously developing the old Silver Bar or Cooney mine, in order to uncover sufficient ore-bodies to enable them to determine the size of the plant to be erected on the mine. A tunnel has been run under the mountain 613 feet upon the lead, piercing three large ore-bodies, while three shafts have been sunk from the surface, No. 1 being down 163 feet; No. 2, 45 feet; and No. 3, 12 feet. From these shafts the 5-stamp mill is kept busy running on ore. There are three Frue vanners attached to the mill and 6 tons are reduced into 1. The pulp, after passing over the first vanner, is heated with a steam-jet pump and then run over copper plates on the other two, saving all the silver, copper, and gold,

except 4 ounces of silver in tailings. The mill is two miles distant from the mines at the mouth of the box cañon, and a good road has been built by the company through the box, over which the ore is hauled to the mill. Considerable experimenting has been made with the little plant for the purpose of ascertaining the best mode of treatment before planning larger works, and the result proves the Frue vanner best adapted to treat the ores of this camp until better railroad facilities arrive.

"*Wilcox mining district*, lately organized in the southern portion of the Mogollon Range, has loomed up rapidly on the showing made by discovery work; the ore-bodies are large and carry 46 per cent. lead, 14 ounces silver, and $20 gold."

In Solid Man's Camp, *Wilcox district*, 12 locations have been made, of which the following are the most prominently developed: Solid Man, Socorro Chief, and Uncle John, all on the same ledge, which can be traced a distance of about 9,000 feet.

The Solid Man has been opened by a tunnel to a depth of about 75 feet, cutting the lode a distance of 11 feet without encountering the hanging wall or any indications of its proximity. In fact, the ledge is estimated to be at the least 30 feet thick.

An open cut on the Socorro Chief has penetrated the ledge a distance of 20 feet, and is said to show mineral at every point.

The same is the case with the Uncle John, which is developed by a cut 15 by 10 feet in width. The adjacent rocks are granite, quartzite, and porphyry, and the ore produced is thought to resemble that of the famous Carlisle mine. The camp is well situated for timber, and a living stream is said to run within 50 feet of the mines mentioned, affording sufficient water to run a 50-stamp mill. For the amount of work done the ore-dumps are large enough to give the impression that they are the result of old workings instead of recent discoveries.

Socorro district.—Mining operations have not been successfully carried on in this district, the most important mines having been idle most of the year, as also the stamp mill at Socorro.

The Torrence and Merritt both changed hands during the latter portion of the year, having been purchased by the Cabinet Mining Company, of Saint Paul, Minn. This company also obtained possession of the mill above mentioned about the same time and for several months has carried on operations with unusual activity. At last accounts from 25 to 30 tons of ore were treated daily, and the net bullion yield was represented to be equal to $1,000 per day. The ore treated was principally from the Merritt, which is said to produce the best grade of free-milling silver ore mined in the Territory. With proper management and reasonable industry it would seem that the mining properties of Socorro Mountain should produce paying ore in sufficient quantities to keep this mill in constant operation in future.

The Billing smelting plant has been in blast to its full capacity for the greater portion of the year. The heavy June rise of the Rio Grande, which submerged the railroad, delayed operations to some extent during June, July, and August, and the completion of the road to the Magdalenas was delayed in consequence, rendering it somewhat difficult to obtain a full supply of ore and fuel for the three 60-ton stacks of which the plant is composed. From 30 to 50 tons of custom ore are daily treated by these works, and the remainder necessary to keep them constantly employed is furnished by the mines of the *Magdalena district*, especially by the Kelly mine, which is owned by the same parties. In

that there is sufficient ore in sight in this mine to supply the works continuously for more than three years.

"The Kelly yields, with few exceptions, all the combinations including galena, the sulphides, black, white, and brown cerussi occasionally native copper and the green and blue carbonates metal appear in small seams. Silver, in varying proportions, i associated in the entire mineral mass and offers itself to view o ally in a native state. The great success of Mr. Billing in ex the Kelly, has given a stimulus not only to mining in the Mag but in all of the various camps which surround Socorro.

"The Cavern, Juanita, Graphic, and several mines in the *Ma district*, are valuable, and are in process of development, which the course of the next year reward their owners for the time and expended upon them.

"In *Water Cañon district*, upon the east side of the Magdalena the expenditure of capital has succeeded in bringing to the number of ore deposits which require more development befor in a condition to produce.

"Marked improvement has occurred in the *Pueblo distric* Guiterez mine is in course of active development and yields argen gray copper, distinguished for the amount of silver which it cont

"Mr. Brittenstine owns a group of claims, notable among v the Carnero, which possesses extraordinary bodies of carbon galena ore containing silver, while other properties furnish strict milling quartz.

"The following mining districts have materially improved dur year: *Pulvadero*, *Limitar*, *Gallinas*, *Ten Mile*, *Ladrone*, *Iron Mo St. Felicite*, *North*, *South* and *Center Oscura*, *Hansanburg*, *Little* and *San Andreas*.

"Socorro possesses in her immediate vicinity all the fluxes ne for the treatment of ores, including lead, lime, and iron, and is t tined point for the treatment of the mineral of the Southwest.

ever, palpable to any observer, that the output of Socorro County is much more than double that made in 1883; in evidence of this position we offer one instance, which will serve as an example. The Billing smelter of this city alone has shipped, each month of the present year, from 400 to 700 tons of lead-silver bullion, the amount of silver varying with the quality of ore treated.

"The mining outlook of this county is improving steadily, as are also the grazing, agricultural, and other resources and industries."

The following is the bullion output of the county for the calendar year 1884: Silver, estimated at its coining value, $600,000; gold, $67,000.

CHAPTER X.

OREGON.

Gold is the precious metal principally produced in the State, an come, as heretofore, from the placers. The production of silver is s The quartz mines, which are known to contain promising veins c riferous metal, have been but little developed.

While Oregon does not rank in production with the other Sta the Pacific coast, the amount obtained varies but little from ye year.

Wells, Fargo & Co.'s annual statement credits this State wit following production for the year:

Gold carried by express	$3
Gold carried by other conveyances	1
Total gold	5
Silver carried by express	
Total	5

It is a well-known fact that considerable gold is carried fron State by the miners themselves, and not reported as obtained Oregon mines. The amount of gold deposited at the mints and offices of the United States during the year 1884, and credited t State, was at the—

Mint at San Francisco	$4
Assay office at Boisé City	
Mint at Philadelphia	
Total	4

Of the $10,000,000 worth of refined gold bullion deposited by M

Counties.	Gold.	Silver.	Total.
aker	$160,000	$2,500	$162,500
enton	5,000	.....	5,000
os	20,000	.....	20,000
urry	20,000	200	20,200
rant	200,000	15,000	215,000
ckson	100,000	1,000	101,000
sephine	110,000	1,000	111,000
nion	45,000	300	45,300
Total	660,000	20,000	680,000

The collection of the statistics of production of the mines of this tate was placed in charge of Mr. E. F. Burton, superintendent of the int at San Francisco, and the following review was compiled under is direction by Mr. A. M. Lawver, of that city.

BAKER COUNTY.

Mr. Edwin W. Reynolds, of Baker City, the manager of the New York lining Company, gives the following information in regard to this prop-rty:

"We have a sufficient supply of water to run a 20-stamp mill. The ine is what is generally known as a pocket mine, although the lode an be traced on the surface for 900 feet. The property is developed y a tunnel. The ore is a hard white quartz. On the top of the lode here is a mass of decomposed matter which prospects 50 cents to the an. Within a radius of 100 miles we have a fine mining country, which, ince the extension of the railroad, offers greater inducements to pros-ectors. This county and Grant have produced since 1882 more gold, robably by one-half, than has been reported, as our dust being sent to alifornia is credited to that State. Only a few persons are engaged in rospecting for quartz, but there is a good field here for enterprising nd industrious miners. The Gold Ridge and the Connor Creek mines ave been successfully worked throughout the season. The placers in his county during the present season have yielded well. TheRye Val-y placer mine, at Rye Valley, has had, during the past year, a success-l run.

"The mines of A. J. Weatherby, located at Weatherby, have been in onstant operation during the past season. These mines are known as he Chicken Creek mines, and are very extensive. The ditches and the ater for working them are owned by Mr. Weatherby, who also owns ost of the mining ground here. The mines are producing well.

"The New York Hydraulic Mining Company made their usual run luring the season, but the returns were light.

"The Nelson Placer mine, near Baker City, has made a very successful un during the past season. This mine has been worked to a depth of 00 feet, and no bed rock has been struck, and the gravel has paid from he surface down. Improvements to the amount of $3,000 were put pon the property during 1884, in the way of increasing the capacity of he ditch, &c. This is one of the largest hydraulic gold-producing mines n the State."

CLACKAMAS COUNTY.

In the Cascade Mountains, about eight miles due south from Table ock, a new mine bearing both gold and silver in considerable quanti-es has been recently discovered. The mine is situated on a tributary

of the south fork of Henry's Creek, which makes into the main fork of the Molalla River, a mile above Ogle Creek. A width of 20 feet has been uncovered, and a cut of 40 feet has been made parallel with the ledge. Neither side wall has been found, though the ledge was traced for a distance of 4 miles. Free gold is plentiful in the rock, which is blue-white quartz, sprinkled through with pyrites and sulphides of iron covered with chloride of gold.

Assays of the ore gave silver, $235; gold, $25; total, $260.

JACKSON COUNTY.

Messrs. Prickett, Finney and Shearer, of Steamboat, have purchased Beckner & Co.'s ditch, and are engaged in cleaning it out, and propose running it on an extensive scale next season.

T. S. Knox & Co., of Applegate, bonded one of their quartz ledges to Portland parties, who intend erecting a mill for the purpose of testing the ore of this as well as other ledges in the vicinity. Many claims on Forest and Jackass Creeks have yielded well during the past season.

Goff & Co., who have excellent mines in the Grave Creek district, made a successful run.

Roten & Sons are taking from their ledge in Willow Springs district quartz which shows considerable free gold.

The China Mines, near Uniontown, are still piping, but they cannot last long with their present supply of water.

The miners of Galls Creek did quite well, and at Ashland the hydraulic mines of E. K. Anderson and McCall and Anderson have been worked a portion of the season with satisfactory results.

The hydraulic mine of Ingram & Dean, at Willow Springs, made a short run; but owing to a lack of water the yield was light.

Kippel & Keaton mine was in active operation during the past season and produced well. The owners have been engaged in constructing a new ditch that will afford more fall for hydraulic purposes, and it is their intention to still further extend it so as to cover all the mining ground owned by this company.

The hydraulic mine of John T. Layton, near Applegate, made a fair run during the past season, but owing to the lack of sufficient water the yield was not an average one. Mr. Layton reports the season of 1884 to be the driest for 33 years.

A very rich strike was recently made by C. McCullough, of Willow Springs, who found a "pocket" of quartz from which he realized nearly $300, pounding it out in a hand mortar. Numerous discoveries made in this vicinity tend to prove the abundance of good paying quartz.

JOSEPHINE COUNTY.

Galice Greek district.—Walter Simons, of this place, is making a good clean up, and so far as known has taken out about $3,000. Owing to a scarcity of water, work has been suspended at Sturgis drifting diggings.

Green Brothers mine has been worked for eight years, but during the past season has not produced, as only development work was done. A tunnel has been run to tap the pay ore 300 feet lower down, and it is estimated that there are overhead at least 2,000 tons of ore ready to be stoped. Prospecting is being carried on at a still greater depth, and so far everything is very encouraging. The average yield of the ore is about $40 per ton.

Mr. Arnott, who is engaged in mining the bed of Galice Creek, is taking out an ounce per day.

Waldo district.—A rich strike is reported to have been made in the mine of Bybee & Co., and several hundred dollars were taken out in a short time.

Miller and Kretzer, at Farmer's Flat, are washing off a good deal of ground, and will probably make a good report at the final clean-up for the season.

At Foot's Creek most of the miners have had a fair supply of water, and, though the season will not be a long one, they will average better than for the two seasons past.

At Grant's Pass precinct, J. W. Stanley is reported to have struck a quartz ledge, the ore from which prospects well.

Mr. De Lamatter, near Kirbyville, has both his claims in operation, and having excellent ground and plenty of water, will make a fine clean-up, for the season.

In *Althouse district* a San Francisco company secured a large area of mining ground, upon which it is proposed to commence the construction of a large ditch.

Beaver Creek district.—Mr. Graham, who is engaged in mining in this district, reports that the mines are turning out well.

On Farmer's Flat, at John Miller's mining claim, piping has also commenced, and extensive preparations have been made for the season's run. Some of the best mines in the State are located in this section, and the miners generally in Josephine County are greatly encouraged at the prospect of the good returns awaiting them.

The Southern Oregon Development Company has 500 tons of low-grade ore ready for shipment to the reduction works in East Portland.

The iron and copper mines of Josephine and Jackson Counties are rich and extensive, and must eventually command attention.

LINN COUNTY.

Reservation district.—Sixty miles southeast of Salem, on the Santiam River, some discoveries have been made, and recent developments give promise of rich returns to those interested there. A mill has been erected, and as the ore will work from $60 to $70 per ton, it will not be long before bullion will be produced. Mr. Christie, who has charge of the mill, states that the ore can be reduced with the apparatus now on the ground. The Black Jack mine has a tunnel 125 feet long, and in going this distance six veins of rich ore from 3 to 8 inches in width were encountered. Mr. Christie is satisfied that there is a mineral belt some 12 miles in width, and is of the opinion that it is a continuation of the gold belt of California. He also says he has examined three leads for a mile and a half, and knows them to contain gold and silver in large quantities. Some of the veins are very large.

On the Pilgrim three men are at work taking out rock which assays $46 per ton in gold and $16 in silver. It is thought that the average of the several ledges will be about $65 per ton. Over thirty claims have been located.

UNION COUNTY.

On the Calumet Mining Company's claim, situated 30 miles from Union, A. J. Hopper, the superintendent, reports work up to within 10

days, when the deep snow prevented further operations. Besides repairing a number of buildings that had been seriously damaged by snow-slides and making other improvements and alterations, a 17-foot open cut was made in one of the main ledges, which disclosed additional evidence of the extent and richness of the property. Instead of following up the work commenced last season, it was deemed advisable to tunnel into the side of the mountain some 300 feet below the surface, where the immense body of rich croppings are so plainly seen, and to tap the main ledge at such a depth as will prove, beyond a doubt, its genuineness, as well as the richness of the ore. The tunnel has already reached a distance of 30 feet, and the main shaft will probably be reached at about 100 feet. Should the ledge, at the point tapped by the tunnel, prove as large and rich as above, the Calumet will become one of the valuable mines on the coast.

COOS COUNTY.

At present very little mining is being done. The Black Hawk Mining Company have been during the past season working their property, which consists of twenty acres of ground, and the production was about the same as in former years. The gold is obtained from black sand.

The Eagle Mining Company's mine is similar in character, but has been idle the past year.

GRANT COUNTY.

The Trail Creek Mine made a good run during the "water season," producing well. It is worked by the hydraulic method.

On Burnt River, in this county, some fine quartz lodes are reported by Wood, Estabrook & Co. About 50 tons of ore have been taken out, which will be shipped for reduction to Salt Lake City. Very little in the way of prospecting has been done of late in this vicinity, but it is expected that its former activity will be renewed, as the railroad has been completed.

John Day mining district.—Mr. John Metscham furnishes the following information relative to mining interests in this district. He says: "Mining operations are confined almost exclusively to placer mines. The Humboldt, on the west side of Cañon Creek, is the best one in the district. This company works two "giants" and employs 11 men.

"John Long's hydraulic mine on the east side of Cañon Creek is in operation; employs three men and produces well.

"At the mouth of Cañon Creek, and thence down the John Day River, about 150 Chinamen are engaged in mining. The aggregate yield of their labor for the past year I estimate at about $45,000.

"At Marysville about 15 men are employed, their operations for 1884 giving a yield of about $15,000.

"A fine location of gold-bearing quartz, owned by Fred. Miller, is situated on the mountains, southwest of Canyon City. The lode runs northeast and southwest, and is well located for mining. Wood and water are abundant, and as soon as capital can be secured to open and work it the mine will be developed.

"In *Elk Creek district* about 30 men are engaged in placer mining, and the total yield for the past season was $16,000. There are in this district a number of well-defined quartz lodes, which have for years been worked with varying success. The only mines from which ore was extracted and crushed during the past season were the Monumental and

the Princess. From the former about 40 tons of ore were crushed, and from the latter about 60 tons.

"The Mocking Bird, owned by Messrs. Sloan & Ray, is a narrow ledge of rich gold-bearing quartz, averaging only from 1½ to 2 feet in width, but some of the samples have assayed $100 per ton.

"The Gem of the Mountains, owned by J. H. Blake, is a gold and silver bearing vein, about 5 feet in width. Work to the amount of $3,000 has been done on this claim, and it is believed by competent experts to be the best quartz lode in the district, but contains so much base metal that new and expensive machinery is required to work it successfully.

"The Little Steamboat is located on the south side of Elk Creek. Assays from this lode have shown a value of $87 per ton. My estimate of the yield for 1884 in the above-named districts is as follows:

Humboldt Mining Company	$16,700
John Long	5,000
Chinamen, 150 (various locations)	45,000
Marysville	15,000
Elk Creek district (placer mines)	16,000
Elk Creek district (quartz mines)	2,000
	$99,700"

CURRY COUNTY.

Mr. Frank A. Stewart, of Port Orford, sends the following information:

The mining interests of this county deserve more notice than they have formerly received. There are numerous gold, silver, and copper bearing ledges located in different parts of the county, but a lack of energy and capital has caused them to lie idle since their discovery.

Messrs. Divelbiss & Sons discovered and located a ledge of gold and silver bearing ore about one year ago, and mineral was traced along the lode for a distance of 8,000 feet. The ore is a mass of pyrites, and assays on the surface from $8 to $75 per ton. The location is but 8 miles from Port Orford. Preparations are being made to drive a tunnel into the mine to open it up.

There are several companies now working on the high bars of the Sixes River, who have been prevented by scarcity of water from producing much bullion.

Rogue River.—The bars along this river are very rich and extensive, but the expense of constructing ditches along the steep rock-bound mountain sides has prevented their earlier development. These bars extend along Rogue River for more than 100 miles, and will in a few years produce more gold than all the rest of Southern Oregon. This region, like that of the Sixes River, abounds in ledges of gold, silver, and copper, and beds of fine chrome, but none of them have been properly prospected.

The beach mines continue the best producing mines in the county. They are found along the entire beach and in old beach deposits from 60 to 180 feet above the present ocean level. The production of gold in this county will be considerably less this year than for 1883, owing to the scarcity of water.

I have estimated the production for 1884 at $22,500.

TILLAMOOK COUNTY.

Regarding the Trask River mines, of which so much has been said of late, Mr. J. L. Story gives the following information:

The entire country bordering on the Trask River appears to be filled with silver. The portion most thoroughly prospected is near the old "Bear Wallow." The specimens sent to Portland are reported to have assayed up in the hundreds, but the reports were undoubtedly largely exaggerated, as an experienced assayer in Tillamook experimented with rock from the same ledge and only made an average of $40 per ton. Those working the mines at the point from which these specimens were taken are erecting homes and preparing to engage in mining in earnest.

The main ledge commences on the upper side of the peninsula, and, running diagonally in a southeasterly direction, passes through the peninsula, and, crossing the river, enters the mountain on the west side of the stream. A quartz mill will be placed at this point, with the necessary apparatus for working the ores. About 50 men are engaged in mining.

Estimate of Mr. A. M. Lawver of the bullion production in Oregon for the calendar year 1884, classified by counties.

Counties.	Gold.	Silver.	Total.
Baker	$208,051	.....	$208,051
Clatsop	1,800	.....	1,800
Coos	5,302	$119	5,421
Curry	27,700	121	27,821
Douglas	5,208	.....	5,208
Grant	269,700	2,500	272,200
Jackson	58,295	.....	58,295
Josephine	50,000	.....	50,000
Randolph	1,240	.....	1,240
Marion	1,047	$119	1,166
Polk	.....	1,140	1,140
Umatilla	3,258	.....	3,258
Union	24,391	.....	24,391
Total	655,992	3,999	659,991

CHAPTER XI.

UTAH.

duction of Utah during the year 1884 shows an increase of lion dollars in silver above that of 1883, bringing it up fully oduction of 1882, while the small quantity of gold annually has not varied materially from prior years.

ld of the Territory, as shown by Wells, Fargo & Co.'s state- as follows:

Works, &c.	Lead, refined.	Lead, unrefined.	Fine silver.	Fine gold.
BASE BULLION.	*Pounds.*	*Pounds.*	*Ounces.*	*Ounces.*
d Works	4,840,987	1,513,455	60,264	292
		12,390,865	651,699	2,188
ining Company		22,380,027	1,435,696	
e Company		11,860,446	326,579	1,111
luct base bullion	4,840,987	48,144,793	2,474,238	3,541
d gold ore shipped		7,879,100	776,421	265
ing copper, 63,372 pounds			3,325	
se bullion and ores, 63,372 pounds	4,840,987	56,023,893	3,253,984	3,806
DORE BARS.				
d Works			283,982	685
Mining Company			1,870,567	
strict			234,563	
d places			17,392	1,039
			2,415,504	1,724

RECAPITULATION.

ds refined lead, at 3½ cents per pound	$169,434 54
ds unrefined lead, at $35 per ton	980,418 12
es fine silver, at $1.08 per ounce	6,123,047 04
es fine gold, at $20 per ounce	110,600 00
ds copper, at 10 cents per pound	6,337 20
port value	7,389,836 90

ing the gold and silver at its mint valuation, and other metals lue at the seaboard, would increase the value of the product 508.

pared with their statement for the prior year there was a large n the production of silver, viz:

Year.	Gold.	Silver.
	Ounces.	*Ounces.*
	6,991	4,531,763
	5,530	5,669,488

The value in United States coin of the production of Utah for 1884, as reported by Wells, Fargo & Co., is—

Gold	$114,315
Silver	7,330,247
Total	7,444,562

Mr. O. J. Hollister, to whom I am mainly indebted for most of the material embodied in my review of Utah, gives the production as—

Bullion.	Ounces.	Value at coining rate.
Gold	5,989	$123,868
Silver	5,450,289	7,046,533
Total	5,456,278	7,170,641

Which does not differ materially from that of Wells, Fargo & Co.

From the above statements it is probable that a deduction must be made for bullion treated at the Utah Smelting and Refining Works produced elsewhere, the value of which, it is safe to estimate, was not less than $250,000.

I have estimated the production of Utah during the calendar year 1884 to have been, approximately: Gold, $120,000; silver, at its coining rate, $6,800,000—a total of $6,920,000, obtained from the mines of various counties as follows:

Counties.	Gold.	Silver.	Total.
Beaver	$10,000	$2,100,000	$2,110,000
Juab	30,000	800,000	830,000
Pi Ute	5,000	10,000	15,000
Salt Lake	75,000	700,000	775,000
Summit	.....	2,800,000	2,800,000
Tooele	.....	90,000	90,000
Washington	.....	300,000	300,000
Total	120,000	6,800,000	6,920,000

Mr. Hollister says: "Utah's product of the precious and other metals for 1884 was as follows:"

Company.	Pig lead.	Base bullion.	Fine silver.	Gold.
	Pounds.	*Pounds.*	*Ounces.*	*Ounces.*
Germania Lead Works	6,840,000	742,000	419,700	1,265
Horn Silver Mining Company	.....	23,107,124	1,437,484	.....
Hanauer Smelter	.....	12,390,865	651,699	2,138
Mingo Smelter	.....	11,860,446	326,579	1,111
Ontario Silver Mining Company	.....	.....	1,923,051	.....
Silver Reef Mills	.....	.....	234,217	.....
Other sources	.....	.....	17,392	1,000
In ores shipped out	.....	10,181,154	822,150	500
Total	6,840,000	58,281,589	5,832,272	6,014
Loss in ores shipped in	.....	2,696,300	251,277	25
Product of Utah	6,840,000	55,585,289	5,580,995	5,989

To get at the value, 5 per cent. of the lead and 3 per cent. of the silver in the base bullion must be deducted for loss in refining, and 15 per cent. of the lead and 8 per cent. of the silver in the lead ores shipped out must be deducted for loss both in smelting and refining. Rating *pig lead*, then, at its average price in New York the past year, viz, 3.73

cents per pound, silver at its average price in New York for the year, viz, $1.10 per ounce, and gold at $20.67 per ounce, we shall have—

Pig lead, 58,627,910 pounds	$2,186,821 04
Fine silver, 5,450,289 ounces	5,995,317 90
Fine gold, 5,989 ounces	123,792 63
Copper, 63,372 pounds, at 10 cents	6,337 20
Total value Utah's product	8,312,268 77

The value of the ores shipped to Utah smelters from other States and Territories is not included in this calculation. It is not accurate to rate base bullion as pig lead, because it has yet to be refined, but we throw it into pig lead in order to be able to put an exact price on it. The above is the total gross value, out of which total cost of production must be taken to arrive at the net value.

Dividends were paid as follows:

Company.	Number of dividend.	Amount.
Horn Silver	4	$1,200,000
Ontario	12	900,000
Eureka Hill	6	120,000
Honerine	1	12,500
Total		2,232,500

It would not be unreasonable to assume that the Beck and Bullion, the Crescent, the Hanauer and Mingo smelters, and the Germania Lead Works made profits enough to bring this sum to $2,750,000, or one-third of the total gross value of the product. This, if trustworthy, makes an excellent showing for Utah mining.

The Eureka Hill is a close corporation, and so is the Beck and Bullion. The former took out $700,000 worth of ore in 1884, upon which the actual profit must have been $300,000 in round numbers. They may have been credited above with $20,000 more or less than they actually disbursed in dividends, as it is difficult to get accurate information respecting private companies. The Beck and Bullion took out nearly half as much ore as the Eureka Hill, but the ore was poorer in silver by one-third. The profits can hardly have been less than $60,000.

The profits of the Crescent on ores sold, year ending October 31, 1884, are given at $83,000. The profits of the three smelters, considering their plants, the men employed, and the business done, we have no means of knowing; but certainly $150,000 would not be an extravagant estimate. This gives the $518,000 added to the dividends paid above, and something to spare.

Approximate value of ores shipped out of the Territory.

Where shipped.	By whom.	Description.	Amount.	Lead assay.	Silver assay.	Lead contents.	Silver contents.
			Pounds.	*Per. ct.*	*Ounces.*	*Pounds.*	*Ounces.*
West	B. B. Van Dusen	Sundry ores	880,000	49	30	430,000	13,200
East	F. W. Billing	Tintic silver	27,000,000	15	45	4,050,000	607,500
Do	Frank Foote	do	517,760	15	30	77,664	7,740
Do	A. Hanauer	do	1,023,270	15	33	153,490	16,896
Do	Sundry	Tintic copper	1,345,690		40		27,120
Do	A. Hanauer	Crescent	12,000,000	32	22	3,840,000	132,000
Do	do	Spanish	1,400,000	45	11	630,000	7,700
Do	do	Lead	2,000,000	50	10	1,000,000	10,000
Do	do	Ontario*	2,000,000				
Total			48,166,720			10,181,154	822,156

* Product included in return of Ontario.

Smelting and reducing product is as follows:

County.	Pig lead.	Base bullion.	Silver.	Gold.
			Ounces.	*Ounces.*
Salt Lake	6,840,000	48,100,435	2,835,462	4,514
Summit	.....	.....	1,923,051	.....
Washington	.....	.....	234,217	.....
Total	6,840,000	48,100,435	4,992,730	4,514

In this the product of Beaver, Juab, Tooele, Salt Lake, and part of Summit Counties, less amount shipped abroad, appears to the credit of Salt Lake County.

Product and value of ores by counties are approximately as follows:

County.	Ore.	Value per ton.	Amount.
	Tons.		
Beaver	43,451	$62 00	$2,631,962 00
Juab	22,944	54 00	1,238,976 00
Summit	41,069	70 00	2,874,830 00
Salt Lake	26,811	42 00	1,126,062 00
Tooele	2,905	60 00	174,300 00
Washington	12,882	20 00	257,640 00
Total	149,062	*56 00	8,303,770 00

*Average.

BEAVER COUNTY.

Mining in Beaver county the past year was mainly by the Horn Silver and the Frisco Companies. Shipments of ore were as follows:

	Ore in pounds.
Horn Silver mine	81,428,505
Cave mine	2,728,463
Carbonate mine	1,396,088
Summit mine	719,687
Sundry mines	198,390
Horn Silver Smelter dump Frisco, matte	578 240
Frisco M. & S. Company's old smelter dump, matte	921,506
Total	87,960,879

The Horn Silver mine is in a contact between trachyte and dolomite at the eastern base of the Grampian Mountain, the southern of three sections, so to speak, of the San Francisco Range, which divides Beaver and Wah Wah valleys. The vein strikes nearly north and south and can be traced a mile or two on the surface. The town of Frisco is a mile or so northeast of the mine. Milford, on Beaver River, is the present terminus of the Utah Central Railway, but a spur of the road climbs the slope west to the mine, rising 1,700 feet in 17 miles. The country is a desert with thin, isolated, north and south mountain ranges rising at intervals out of it. Aside from Beaver River, which, as it runs, grows smaller until it sinks, there are no streams, and springs are few and scanty. But the mountains are full of mineral, and with means and well-directed effort would yield a rich return.

The Horn Silver mine passed from the hands of the discoverers into those of Campbell, Cullen & Co., early in 1876, and was sold by them *to the* Horn Silver Mining Company, February 17, 1879. The company

has a capital of $10,000,000 in 400,000 shares. The property comprised the mine, a three stack smelter at Frisco, a small lead refinery at Chicago, engines, machinery, and appurtenances. The owners had taken a one-fourth interest in the extension of Utah Central Railway from Juab to Frisco, 140 miles, which was completed in June, 1880, and a little later was extended to the mines and smelter. A steam hoist was erected over a new shaft 300 feet southeast of the original working shaft (lower down the hill). The refinery at Chicago was enlarged to a capacity of 50 tons a day. In the fall of 1880 sampling facilities were completed at the hoist, and weighing, classifying, and sampling the ores began.

Owing to lack of water, fuel, and fluxes at Frisco it was determined to remove the smelter, and no better place nearer than the Jordan Valley existing, ground was purchased on the Big Cottonwood, 7 miles south of Salt Lake City. The place selected was christened Francklyn after the president of the company, and five stacks able to smelt 100,000 tons of material per year, inclusive of fuel, were built and blown in during 1881, and smelting at Frisco was thereupon abandoned. The comparative cost of smelting that year at Francklyn and at Frisco was $14.73 and $29.41 per ton, a saving of 50 per cent. in favor of Francklyn.

The following tables are of interest. They give the output of the mine from its purchase by the company to the end of 1884, and what was realized for lead and silver, the former sold in Chicago, the latter in New York. 1884, estimated, 5 per cent. of the lead and 3 per cent. of the silver in the base bullion product for 1884 being deducted on account of loss in refining:

Year.	Ore smelted.	Assay value of ores.		Bullion produced.	Bullion assays of silver.
		Lead.	Silver.		
	Pounds.	*Per cent.*	*Ounces.*	*Pounds.*	*Ounces.*
1879 to 1881	103,516,013	36.12	46.73	33,829,918	140.44
1882	97,102,086	37.79	38.00	32,255,032	102.96
1883	85,326,115	36.83	27.15	30,017,792	75.05
1884	78,370,000	30.91	39.00	23,205,694	128.89
Total	364,314,214	35.61	38.15	119,308,436	110.64

Year.	Net pounds lead sold.	Average price per cwt.	Realized from sales.	Net ounces silver sold, 999 fine.	Average price per ounce.	Realized from sales.	Sales of lead.	Sales of silver.
					Cents.		*P. ct.*	*P. ct.*
1879	3,112,177	$4 07	$126,620 58	226,955.46	113.45	$257,755 89	89.55	93.51
1880	7,900,867	4 53	353,449 46	576,878.94	113.48	660,630 92	89.55	93.51
1881	15,787,375	4 61	729,033 55	1,034,274.71	112.49	1,168,814 86	89.55	93.51
1882	29,135,597	4 60	1,342,973 25	1,751,212.54	113.65	2,010,087 79	88.84	95.60
1883	29,9 2,803	4 20	1,260,369 54	1,165,224.13	110.40	1,312,772 61	94.08	93.00
1884	21,951,768	3 50	768,311 88	1,394,360.31	110.00	1,533,796 34	94.73	93.44
Total ..	107,770,587	.....	4,580,778 26	6,148,906.09	.....	6,943,858 41	.....	.....

107,770,587 pounds lead, sold in Chicago for	$4,580,778 26
6,148,906 ounces silver, sold in New York for	6,943,858 41
11,678¼ ounces silver, sold in London for	12,654 12
2,585 ounces silver lost by railroad company, at $1.12	2,891 20
3,264,341 pounds base bullion, sold in Utah for	244,399 93
12,301,963 pounds ore, sold to other smelters for	194,123 66
Total gross yield of mine to the company	11,978,705 58

Prior to sale of mine to the Horn Silver Mining Company there smelted 16,299 tons of ore assaying an average of 38.49 per cent and 47.49 ounces silver per ton, which produced, less loss in sm and refining, of 15 per cent. of the lead, and 8 per cent. of the s 10,360,000 pounds pig lead and 712,262 ounces silver, worth, ratir lead at 4 cents a pound and the silver at 112 cents per ounce, $1,212,1 Besides, in those years two thousand tons or more of ore were s smelters, but this was probably offset by Cave (fluxing) ores bo therefore no account is made of it. Total output of the mine to 1884 204,607 tons of ore, which yielded 69,380 tons of base bullio 7,260,566 ounces fine silver, sold for $13,190,838. Four million per share, have been disbursed in dividends, three and one-half mi in the last three years.

It cost $5.07 per ton during the past year to put the ore on the viz: Work on ore, $2.31; dead work, $0.46; surface work, $0.74 plies, timbers, fuel, oils, tools, powder, &c., $1.56; total, $5.07. C supplies for the year, including 1,481 M feet of timber, was $57,9 There were 27,000 days' work on ore; 52,524 pit cars were hoiste car every ten minutes of the year; about 3,600 cars of ore were shi and 427 tanks of water used. Transportation bill for ores alon about $225,000. A year ago a new shaft and hoist, 200 feet east old one, were begun. The shaft reached the seventh level and c tion was made with the vein early in January, 1885. There is no and none is expected above the water-level of Beaver Valley. Th works are complete in all their appointments, and attachments o chine and other shops are planned to work the mine to a depth of feet.

This shaft is near the linear center of the original property. eighth level is being opened to the south end of the property. claim has been bought adjoining the Horn Silver claim on the ea another on the north covering the vein, making the mine 2,94 long. The fifth, sixth, and seventh levels are being opened north and are in interesting ground. A shaft is to be sunk in the mid the new north ground and these levels connected with it and o north and south, the whole 2,940 feet. A shaft within 300 feet north end of the original Horn Silver has been sunk to the third and that level, first connected with the same southward, is being o north, and is already some distance in the new ground. The main is to be kept going down. The ground is to be prospected. If t sure contains but one ore-pipe in a length of 3,000 feet it will b strange. Most of the dead work in the mine is done by contract men are carried on the pay-rolls, 42 of them laborers; all as a rule ten-hour shifts. Miners are paid $3.50 per day, laborers $3. Mor 100,000 feet of timber per month are used in the mine, yet it cos 50 cents to timber a ton of ore.

The smelter at Francklyn consists of five steel-jacket furnaces, the necessary buildings, roaster, power, and machines for crushin all the appurtenances and appliances of a first-class lead-ore sm establishment. It is eligibly located between the main tracks o railroads and employs 80 men. The ores are sampled here a the mines, and separate accounts kept with mine and smelter. fire stacks smelted the past year, including fuel, 103,079 tons of rial. Cost of smelting is $13.29 per ton of ore; per ton of bullion, of refining bullion at Chicago, $8 per ton.

The operations of the Frisco Milling and Smelting Company for

were mainly development work. The company is an eastern organization with a capital of $2,000,000 in 80,000 shares. Besides the Carbonate and Ratler mines near Frisco, they own a $35,000 dry concentrating mill at the same place, and the Cave and other mines in *Bradshaw district* on the Granite range, seven or eight miles southeast of Milford.

The Carbonate and Ratler are locations end to end on the same vein, a strong fissure in trachyte, striking nearly across the Horn Silver fissure, standing almost vertical, the vein—filling mostly decomposed country or trachyte, soft and light, mixed with silver lead in the ore chimneys in the proportion of four parts of trachyte to one of ore.

The Carbonate has been opened by an incline and a series of levels to a depth of 600 feet. A vertical shaft has been sunk on the Ratler, 600 feet east of the Carbonate incline, to a depth of 600 feet, and 7 levels opened, the seventh from the 600 foot station. It is noted as curious, that no lump galena is found in the Carbonate below the third level, and none in the Ratler above that level. The seventh level of the Ratler is to be extended under the Carbonate's old levels. Water for the 50-horse hoist on the Ratler is drawn out of the Carbonate mine. From 4 to 8 tons of the mixed trachyte and lead ore are dressed into one by the mill at a cost of $1.50 a ton, the product sampling about 50 per cent. lead, and 60 to 100 ounces silver, the tailings being left clean. The mill concentrates 30 tons in a day of 10 hours with 6 hands.

The Cave property comprises 200 acres on the west face of Granite Mountain, and lies from 1,000 to 2,000 feet above the valley. The formation is stratified blue and white dolomite, underlaid by porphyry and shot through with dikes of the same. There is a twist or break in the formation, crossing its strike, and it is along this break that the ore caves occur. It was discovered in a large cave which opened to the surface about half way up to the upper outcrop. From this there falls off down the mountain for 300 feet, and for a width of 200 feet, a series of ore caves, worked out through a tunnel 175 feet vertically below Discovery Cave. No thorough prospecting has been done below this level, save as hereafter stated.

From Discovery Cave a tunnel has been run directly into the mountain 1,500 to 1,800 feet in all. For a good part of the way it is in ore-cave country. Above, below, and on either hand are the fissures in the lime, which occasionally open out into caves. The last 500 feet of the tunnel is an incline at an angle of 45°, which at the foot is 900 feet below a cave opening vertically above it to the surface and striking with the formation, out of which 1,000 tons of fine ore have been taken. There is water at the foot of the incline, and an engine has been placed at its head to hoist and pump.

The ore occurs in strata on the floor of the caves: (1) A gray sand carbonate; (2) a limonite 15 to 20 per cent. lead, and carrying $20 in the precious metals; (3) the same with no lead, but worth $10 in gold and silver. Separately or together it is a fine flux, varying greatly in value; $20 to $25 a ton may be a fair average for the second class, $40 to $60 for the first class. But little timbering is required, and it is easy driving in the clefts and fissures. Stull timbers cost 8 cents a foot, square timbers $25 per thousand. The Summit, which divides the hill with the Cave, as the Richmond divides Ruby Hill with the Eureka Consolidated, changed hands last summer, and development, reasonably encouraging to date, is to be continued.

There are several mines in *Lincoln* and *Star districts*, on opposite sides of Beaver Valley, south of Milford, which are supposed to be valuable,

but there is little doing on them, as will be seen from the light shi ments.

At Frisco there is a very promising showing on the Horn Silver fi sure, next south of that great mine. Hoisting works were bought : Pioche early in the past year and partly set up on the claim, and the work ceased. A shaft had previously been sunk in the east countr 300 or 400 feet, but no drift run to the vein. The float in this vicinit is as abundant as it was about the outcrop of the Horn Silver itself.

The claim next south of the above was prospected formerly to son extent by an Eastern company, of which the late M. L. Cody was th organizer and moving spirit. He dying, it was allowed to be sold u der the sheriff's hammer for debt; and, the time for redemption expi ing, deed has been made by the sheriff to the purchasers, under judg ment, and they are said to intend to resume the opening and prospectin of the ground.

North of the Horn Silver the condition of things is similar to th foregoing. Eastern companies organized on the properties, spent thei money, found nothing of value, and quit.

The copper-silver mines, situated on the other side of the mountai northwest of the Horn Silver, sold to a French company in 1883, wer idle the past year. Outside of the Horn Silver and the Frisco Milling and Smelting Companies, practically nothing was done in Beaver County in 1884.

Mr. Peter S. Martin of Frisco has very kindly furnished the following statement of the production of the mines of *Star district*:

Production of mines.

	Silver.
Rebel	$4,000 00
Hamburg Hill Company	910 00
Hemple	2,000 00
Elephant	360 00
Total	7,270 00

He says: "This is the production of Star district for the year 1884. It is no criterion of the amount of development work being done, as there have been about 30 miners steadily employed. The Victory patented mine has had a force of 12 men developing and prospecting the greater portion of this year. They have considerable ore on the dump, and much more in sight in the mine.

"The Saint Mary's mine shows a large body of silver lead ore.

"The Hanana is 240 feet deep, and shows 2 feet of 30-ounce ore in the bottom.

"The Stalwart, 230 feet deep, has a vein 6 inches thick of 500 ounce ore; 2 men are employed. Many other mines are being worked. The Empire, Creedmore, St. Peters, True Fissure, Osceola, La Plata, Bismarck, Burning Moscow, and the Monitor. A 2-stamp mill has been put up in Minersville by I. H. Dupaix for working the ores from the Hemple mine. It has been very successful, and will do much toward opening up many other quartz ledges which have been idle for 12 years. The low price of lead and the cost of transportation will close down most of the silver-lead mines."

BOX ELDER COUNTY.

Newfoundland district consists of a mountain of granite and porphyry, 12 miles long, rising 2,000 feet out of the desert. There are said to be *some* promising ledges there, but somehow not much is done with them.

JUAB COUNTY.

Tintic district.—Shipments of ore from Tintic district in 1884 were as follows:

Mine.	Ore.
	Pounds.
Eureka Hill	29,722,510
Beck and Bullion	13,240,190
Carissa	545,370
Park	365,420
Copperopolis	255,100
Northern Spy	193,310
Showers	140,760
Eureka, No. 5	98,780
Swansea	88,380
Copper ore	555,160
Small shipments	329,550
Total	45,887,960

This district lies in the Oquirrh Mountains, and the range extends southerly from the south shore of Great Salt Lake 100 miles or more, and is built up of azoic and paleozoic rocks whose lower series are largely crystalline. The mines are from 6,000 to 7,000 feet above the sea, and crop out on both slopes, off and on the whole length of it, as at Stockton, Dry Cañon, Ophir, Bingham, Lewiston, Eureka, and Diamond. The veins strike with the range, are nearly vertical as a rule, and are both fissure and contact, with quartz, gangue, and bearing ores of iron, lead, copper, gold, silver, bismuth, &c. The greatest activity is in the neighborhood of Eureka Hill, in the Silurian limestone of the northern part of Tintic district. The ores are lead-silver, 12 to 15 or 20 per cent. lead, 20 to 100 ounces silver per ton, the average probably not far from 40. The Eureka Hill property itself consists of the Eureka and Montana locations, side by side, 2,200 feet long with an average of 200 feet wide, laid with the strike of the strata nearly north and south, and reaching from Eureka Gulch southward to the summit of Eureka Hill, a cone rising vertically from the gulch to the highest workings, 600 feet. These locations are the oldest in the vicinity, and are patented.

The formation is stratified blue lime standing on edge and striking as stated. The ore makes between the strata, seeming to have replaced the limestone; sometimes it is the thickness of one stratum, sometimes of several strata, and it makes across the stratification as well as with it, so that the workings are on continuous ore a length of 1,800 feet, and at the main shaft a width of 300 feet, both on and beneath the surface. The lode or ore-bearing formation appears from the croppings to be at least 400 feet wide.

The workings are very extensive, aggregating in length probably 4 to 5 miles. From the nature of the formation, and the way in which the ore makes, they are a vast and confusing labyrinth, of which a description without maps can give but little idea. They are in part of the nature of adits, running from the outcrop at different levels, connected with one another by winzes and opening to the surface through shafts from which general skeleton cross and other openings follow the ore wherever it makes. The main shaft, 700 feet south of the gulch, has reached a depth of nearly 600 feet, the adits above becoming drifts or levels below, or when starting from the shaft. The fifth is the lowest level opened; the ore-bodies are large on this and the fourth and third levels.

The output for 1884 is given above. It was even larger in 1883. Fe the average of the ores was about 15 per cent. lead and 45 ounces per ton. At least $100,000 were disbursed in dividends in 1884. comparatively dry the ores have mainly gone to Colorado, wher iron ores not having to be bought to flux them, as has to be l done in Utah, the smelters can afford to pay a higher price for They are wagoned from the mine to Ironton station and thence sl by rail. From 75 to 100 men are employed. The mine is equippe steam-hoist, air-compressor for machine-drilling, and all the app ances for economical working. The property belongs to the E Hill Mining Company, a close corporation, with 10,000 share There is a great deal of unexploited ground and abundant ore re and the mine is supposed to be practically but at the beginning producing stage. Its prosperity has greatly stimulated prospect the neighborhood.

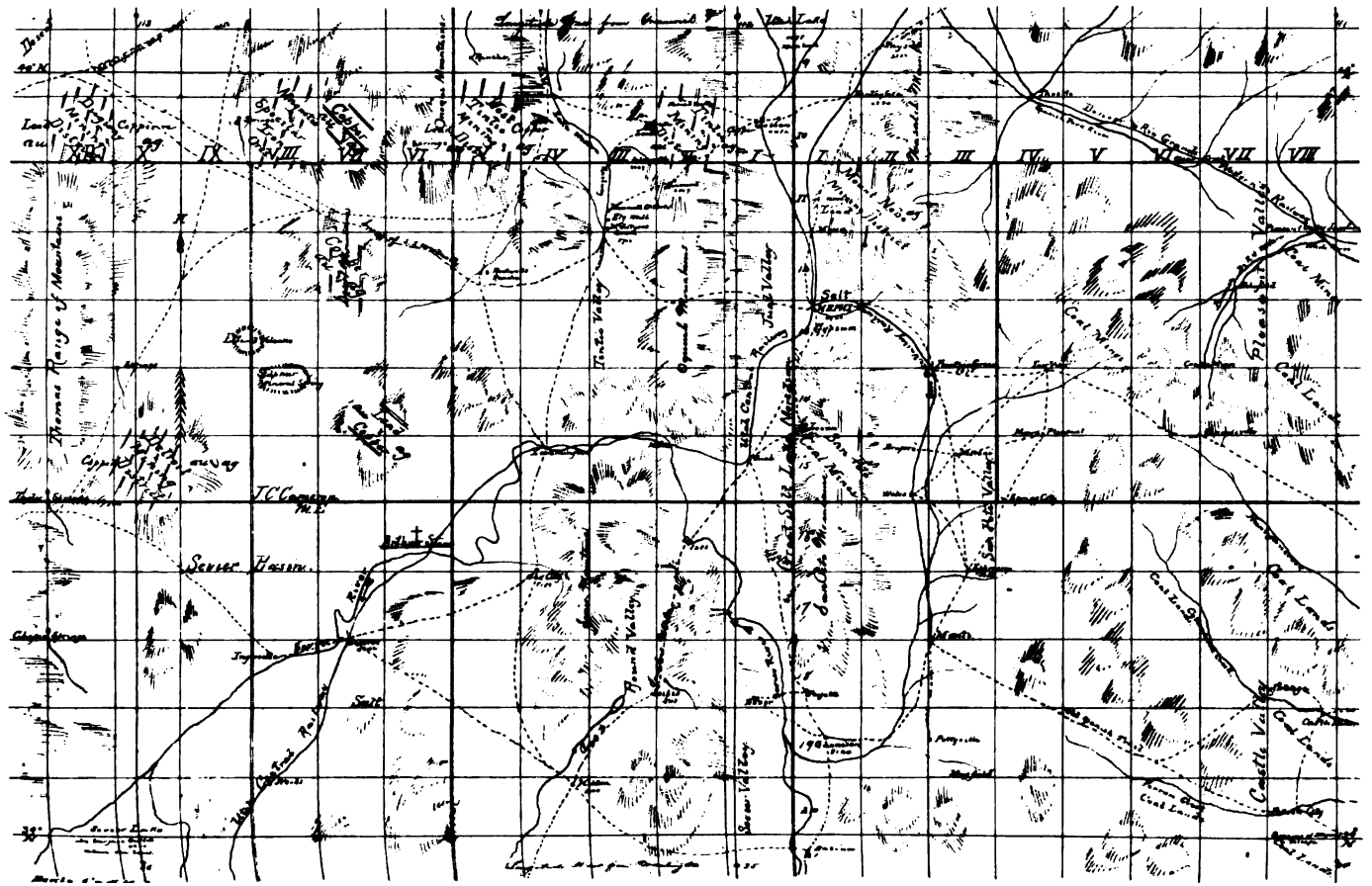
The Bullion Mining Company own the adjoining property nort consisting of the Bullion, Beck, and Champion locations, 300 fee by 2,700 feet long. Their main shaft is 250 feet deep and is op by steam-hoist; about 40 men are usually employed. The outp 1884 averaged about 15 per cent. lead and 30 ounces silver pe The property has produced well from grass roots, but it seems t come into conflict with the Eureka Hill, and what promises to great contest in the courts is already begun.

At the same time Martin & Co.'s Red Bird, a location next no part of the Eureka Hill and east of the Bullion Company's groun run an incline 450 feet down under the latter, with which their clai flicts, the Red Bird being the older location. The Red Bird is equ with steam-hoist and designs to increase its force to twenty-five or hands. North of the Red Bird and Eureka Hill is the property Keystone Mining Company, two claims, working-shaft 250 feet with steam-hoist, employing nine men, exploiting and finding i tions of great promise. Adjoining this property on the west Jackman, from appearances a valuable prospect.

The Eureka No. 5 lies south of the Eureka Hill. The shaft is 120 feet. The ore is high grade. A tunnel is being driven to c vein at a depth of 200 feet. South of and adjoining this prop the Centennial Company's ground, now being opened and exploit are also the Summit, Slim Jim, Nora, Fairplay, Mono, Ridge, Eagl others all around the wonderful Eureka Hill.

The Tintic Mining and Milling Company's 10-stamp chloridizin is about 2 miles northeast of Eureka town at *Homansville*. It h ured largely in the production of Tintic district since 1880, but closed down most of the past year. Ores are obtained by purch part, and in part from the Northern Spy mine, which is owned by s the stockholders in the mill company. The mine is opened to a of 350 feet, and has always ranked with the prominent mines of

The Mammoth group is about 1½ miles south of Eureka Hill. ores contain little if any lead, but are worth about $50 a ton in silver, and copper, a combination, however, hard to manage. Crismon Mammoth, after several years' working by stamp mill trials by roasting and by lixiviating, was sold two years since English syndicate, who partly paid for it and put on a great pla matting and then refining the matte by some electric process. the plant was completed one of the syndicate died and the co broke up, leaving a heavy indebtedness. This has not yet been en *settled*. The old owners have possession, but nothing is doing.


Thomas Range of Mountains
Dugway Mountains
Salt Lake
Great Salt Lake Desert
Great Salt Lake
Jordan Valley
Utah Valley
Sevier Basin
Sevier Lake
Sevier River
Sevier Valley
Pleasant Valley
Castle Valley
Grand Valley
Green River
Colorado River
Price River
Wasatch Mountains
Uinta Mountains
Book Cliffs
Roan Cliffs
Coal Lands
Oil Lands
Asphalt
Gilsonite
Salt Springs
Hot Springs
Fish Springs
Deep Creek
Pilot Peak
Gold Hill
Ophir
Stockton
Tooele
Provo
Nephi
Manti
Ephraim
Fairview
Spanish Fork
Thistle
Soldier Summit
Castle Gate
Scofield
Wellington
Price
Helper
Green River
Thompson
Grand Junction
Salina
Richfield
Gunnison
Delta
Fillmore
Juab
Levan
Leamington
Lynndyl
Kanosh
Meadow
Milford
Beaver
Cove Fort
Minersville
Parowan
Cedar City
Iron Springs
Iron Springs Mining District
Iron Springs Coal Mining Co.
Iron Springs Coal Co.
Iron Springs Coal Co. No. 2
Iron Springs Coal Co. No. 3
Iron Springs Coal Co. No. 4
Iron Springs Coal Co. No. 5
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s opened 500 feet, showing one of the largest ore-chimneys ever in Utah.

h of the Crismon Mammoth a group of eight or ten claims will e cut through 500 feet under ground by the Saint Nicholas Tun- The Mammoth Copperopolis, south of the Crismon Mammoth, the same kind of a mine, once owned by a British Company, is wned and worked by the American Eagle Mining Company, or lease from them.

k is being prosecuted on the Caledonian Tunnel, projected to be der the mountain between Eureka Hill and the Mammoth group, t below the deepest workings in either. The shipments from the a were from a new shaft on the property, and did not commence ward the end of the year.

ing is being resumed to some extent in West Tintic. The Scotia en abandoned for some years, but an incline is now going down ne ore-pipe, from near the bottom of the old workings. The ores lena and carbonate of average grade, and there is a stratum of re which is believed to contain $20 per ton in gold.

iron mines east of Silver City shipped about 23,800 tons of flux- n during the past year, mainly to the smelters in Jordan Valley, Salt Lake City.

J. C. Cameron, a mining engineer residing at Eureka, has fur- l the following statement of the production of *Tintic district*, and ne accompanying map, with the description of the mining proper- hich appear on it. He says: "The approximate production of nd silver of Tintic mining district for calendar year 1884 was:

Hill Mining Company	silver..	$480,000
Mining Company	do....	204,000
mine	do....	18,000
th Copperopolis (now American Eagle)	do....	38,400
n Spy (Consolidated)	do....	36,750
th Copperopolis (American Eagle)	gold..	9,600
n Spy (Consolidated)	silver..	12,250
maller mines	do....	9,810
d silver contained in iron ore shipped		75,000
Total		883,810

e foregoing is as correct an estimated statement as can be obtained earing upon the product of the mines in Tintic. Those being ed are owned by corporations or individuals who publish no ents of their business and do not care to have any made public. res extracted containing the precious metals are of the lead- and copper-silver class, and are sold for reduction at smelting in Utah and Colorado, and enter into the silver product of those . The iron ores shipped are used as flux in the lead-smelting in Utah chiefly, and will average at least $3 per ton in gold and . The estimated valuation given is based upon the quantities of ipped and from personal knowledge of values of same. Have no l information as to data. At the same time, a residence of ten years as enabled me to know very closely the ore values of the district. ance has been made for loss in smelting the ores, so that the district e credited with the estimated total production.

he Mountain Chief is situated about a mile north of Silver City, s probably a contact vein between quartzite and granite formation, ng northerly and southerly with a nearly vertical dip. It is opened afts, levels, winzes, &c., in aggregate about 1,200 linear feet upon

the lode, and the greatest depth attained is 300 feet below the surface. From the most reliable data obtainable there have been some 720 tons of lead-silver ore produced, ranging in assay 40 per cent. lead and 60 ounces silver per ton, or a gross valuation of $58,000; deducting for smelting, mining, and transportation charges $20,000, would leave a net profit of $37,000, or an equivalent of about $17 per ton of vein-stone mined. The Mountain Chief is owned by James Reed and others, of Silver City.

"The Chloride mine, situated about three-fourths of a mile easterly from Silver City, is a true fissure, in porphyritic trachytes, running northerly and southerly, dipping vertically with slight westerly inclination. It has been opened by an aggregate working of 350 feet, the greatest depth attained being 120 feet below the surface. There have been produced about 233 tons of marketable ore ranging in value of lead and silver $85 per ton, or a gross valuation of $12,815; allowing $7,000 for mining, smelting, and transportation charges, would leave a net profit of $5,815, or an equivalent of about $18 per ton of vein-stone extracted. In the lower workings small deposits of yellow and gray copper cropped out, assaying from 12 to 20 per cent. copper, 40 ounces silver, and a fair trace of gold per ton.

"The Sunbeam, easterly from the Chloride, discovered December 13, 1869, the first discovery in the district, is situated in porphyritic trachytes, and is a vein system carrying gray copper with gold and silver in combination. Upon this lode are several patented claims which are developed to quite an extent, and from which considerable valuable ore has been taken; exact data is not, however, available. The mine is worked by Frank McHatton and others.

"The Carisa, situated northeasterly from the Sunbeam, and about 3 miles from Silver City, is essentially a copper-bearing lode, carrying silver in combination; the copper is found as a carbonate in vein formation in Silurian limestone. The ores range in assay from 10 to 20 per cent. copper and from 30 to 40 ounces silver per ton. The mine is owned by Boline Roberts, of Salt Lake City, and is worked under lease by L. E. Ritee, employing sixteen men.

"The town of Diamond is situated in the southerly portion of the district, and 3 miles from the terminus of the Salt Lake Western Railway.

"The Joe Bowers, the oldest location here, has been subdivided into several claims. One of them, the Summit Bowers, has been opened in aggregate 330 feet; the greatest depth attained is 130 feet from the surface. The ores extracted are of the milling class. The shipping ores rate $100 per ton, and are selected from the vein gangue. The property has paid the owners a net profit of about $4.50 per ton of vein-stone mined. This claim is situated in the porphyritic and syenitic granite, and is considered a double vein-system.

"The Silver Spar is a parallel vein formation carrying lead-silver ore, and is opened in the aggregate 335 feet. The greatest depth attained is 140 feet from the surface. There has been produced from this property about $14,000, at a net profit to the owners of $5,000. It is owned by J. T. Thurmond and others, of Diamond.

"The Showers, an adjoining and parallel vein formation carrying lead-silver ore, is opened by something over 1,000 linear feet of workings. The ores mined and sold range from 25 to 40 per cent. lead and from 30 to 60 ounces silver per ton. It has for several years been worked on a lease by William A. Jackson, and is owned by Walker Brothers, Salt Lake City.

elle mine is situated southerly from Diamond nearly 2 miles, ilver-bearing ore-vein in porphyritic trachytes. It is opened gregate working of 540 linear feet. The greatest depth at- 215 feet. From all available data the mine has produced ,000, at a net profit of nearly $6,000, or an equivalent of about ofit per ton. It is owned by Denis Sullivan, of Diamond.

idge mine is situated easterly from the Eureka Hill mines, and llel vein formation. It is opened to a depth of 160 feet from ce upon a 4-foot vein of free-milling ore, yielding in assay 60 ver to the ton. It is owned by Capt. John McCrystal and usick, of Eureka.

Eagle, adjoining and parallel with the Eclipse, a southerly ex- f the Ridge, is opened by a shaft to the depth of 100 feet upon in of fine milling ore, assaying from $40 to $300 per ton. This red one of the best vein formations in Tintic, and is prospect- luable mining property. It is owned by Capt. John McCrys- reka, and J. C. Watson, of Lake Superior, Mich.

res of Tintic and the Sevier Basin are in no sense of high grade, ess sufficient intrinsic value to be profitably worked. The of this region of country has been to some extent retarded by its remoteness from commercial centers."

H. Blanchard, recorder of Juab County, has very kindly fur- list of the producing mines of Tintic district, with the produc- ach during the past year, and very valuable information in the character of the ore, number of men employed, &c., and of mines located in the same district that have produced in nd which he thinks have merit.

ucing mines of Tintic district, Juab County, Utah, with the output of the same, from January 1, 1884, to December 31, 1884, inclusive.

[Marked *P* indicates patented.]

e of mine.	Men employed.	Character.*	Quality.†	Country rock.	Assay value.				Tons.
					Lead.	Copper.	Gold.	Silver.	
					P. ct.	*P. ct.*		*Oz.*	
illion (*P*)	50	S. L.	S	Limestone	30	.....	.....	30	6,671
n Extension (*P*)	20	I	S	Limestone and porphyry.	(§)	.....	.....	.....	25,098
.....	2	S. L.	S	Porphyry	8	12	.....	51	12
.....	16	G. S. C.	S	Limestone	24.61	7½	$5 90	51½	427
.....	2	S. L.	S	do	.....	.....	10 00	50	125
(*P*)	100	S. L.	S	do	30	.....	.....	30	14,905
Old Dump)	2	S	M	Porphyry	.....	.....	.....	65	6
.....	2	S	M	Old Dump	.....	.....	.....	100	26
.....	1	S. L.	S	Limestone	30	.....	.....	30	15
.....	2	S	M	Porphyry	.....	.....	.....	140	5
.....	2	S	M	do	.....	.....	.....	155	4
opperopolis) (*P*)	10	S. C.	S	Limestone	.....	5	19 60	31	735
lef	3	S. L.	S	Granite	54	.....	.....	104	55
y	3	S	M	Porphyry	.....	.....	.....	50	14
y	12	G. S.	M	Limestone	.....	.....	5 00	45	630
.....	4	S. L.	S	Granite	40	.....	.....	50	105
.....	2	S. L.	S	Porphyry	40	.....	.....	80	57
.....	2	S	M	do	.....	.....	.....	150	10
.....	2	S	M	do	.....	.....	.....	60	14

es gold; S., silver; G. S. C., gold, silver, and copper; S. L., silver lead; G. S., gold and silver and copper; I., iron.
s smelting; M. indicates milling.
he entire year, all others from one to six months.
ths of 1 per cent. of iron.
eds $509.51.

List of mines of Tintic district that have merit, but have been unproductive during 1884.

[Marked *P* are patented.]

Name of mine.	Formation.	Cause.
Mammoth Crismon (*P*)	Limestone	Idle; law-suits.
Red Bird* (*P*)	do	Worked 8 men prospecting.
Keystone* (*P*)	Granite	Worked 6 men.
Tesora	Porphyry	Do.
Black Dragon (*P*)	Limestone	Idle.
Golden Treasure (*P*)	Porphyry	Do.
Julian Lane (*P*)	do	Do.
Lady Aspenwall (*P*)	do	Do.
Joe Bowers (*P*)	do	Do.
Rising Sun	do	Do.
La Bonte	Limestone	Do.
North Star (*P*)	do	Do.
Boss Tweed	do	Do.
Black Jack (*P*)	do	Do.
Little Mack	Granite	Do.
Sunbeam (*P*)	Porphyry	Do.
Elmer Ray (*P*)	do	Do.
Champlain 2d	Limestone	3 men prospecting.
Estella	Porphyry	Idle.
June Rose	do	Do.
King James (*P*)	do	Do.
Brooklyn (*P*)	do	Do.

* These have steam hoisting works.

There are many other claims that may prove of value when developed, but they are too numerous to mention.

SALT LAKE COUNTY.

Bingham.—Shipments of ore from Bingham in 1884 were as follows:

	Pounds.
Brooklyn	18,656,760
Lead	12,000,000
Yosemite	3,900,000
Spanish	3,768,355
Old Telegraph	3,672,080
Nast	1,090,320
Dixon	732,040
Tiwaukee	554,650
Neptune	447,600
Silver Hill	445,410
Saturn	445,770
Winamuck	428,500
Utah	350,640
South Galena	314,560
Silver Shield	335,440
Frisco	204,300
Eight mines shipping more than 50 and less than 100 tons each	1,050,100
Thirty-four mines shipping less than 50 tons each	1,178,595
Total	49,575,120

The Brooklyn mine is a consolidation of the Brooklyn (formerly the Martin, or First West Extension of the Telegraph) and the Revere. Its outlet is via Yosemite Gulch and Butterfield Cañon. The ores are wagoned to Sandy at $3 a ton. Return freight is $5 a ton. Timbers are brought from the west or Tooele side of the range (Oquirrh), and cost 10 to 11 cents per running foot. Coal costs $10 a ton. Ninety men are employed, at $3 a day. Water is piped 2 or 3 miles from springs. New hoisting machinery has been placed, and is deemed sufficient to work the mine to a depth of 2,000 feet. Below the hoist is the ore-house,

and below that a 5-stamp concentrating mill, with square buddles. It concentrates 20 tons a day into 4 tons of shipping ore, leaving very little in the tailings. The first-class or shipping ore averages 50 per cent. lead and 9 ounces silver; second class, 20 per cent. lead and 4½ ounces silver per ton. No more of the latter is taken out than is necessary in prosecuting the work. There are great quantities of it in the mine and 5,000 to 8,000 tons on the dump.

The property is on the great lead-ore ledge of Bingham, which is 3 miles long, strikes northeast and southwest, dips from the northwestern horizon about 40 degrees, and is from 12 to 190 feet thick, between a quartzite foot and a lime-shale hanging country rock. The ore makes in pipes 100 to 150 feet through on the course of the ledge, and from 2 to 6 or 8 or 12 feet, and it may be 20, in thickness. One hundred feet in 500 feet along the ledge is ore. The Brooklyn covers the lode for 2,600 feet. The workings are in Yosemite Gulch, 1,000 feet from the northeast end of the mine, and consist of an incline to the twelfth level, which is nearly 1,200 feet down on the slope, with levels opened last December as follows, viz:

Levels.	Southwest.	Northwest.	Total.
First	700	620	1,320
Fifth	572	745	1,317
Sixth	431	315	746
Seventh	406	730	1,136
Eighth	373	740	1,113
Ninth	476	531	1,007
Tenth	496	686	1,182
Eleventh	220	189	409
Twelfth	72	73	145

The ground rises from the works in the gulch each way 200 to 300 feet. The first level southwest has been connected with the bottom of the old Revere workings. It is still 1,000 feet from the southwest end of the property, and is at least 1,100 feet above water-level. A tunnel starting in from the gulch below the works connects with this level southwest, allowing the cars to be run out instead of hoisted, and helping the ventilation. A series of raises is being brought up from the lower levels and from the fifth to the first and the second, third, and fourth are to be worked out through the fifth.

The mine has three regular ore-pipes in the length of ground broken continuous from the surface, and new ones are coming in on the sixth and seventh levels southwest and on the tenth southwest and northeast. Iron pyrites occur in the center ore-pipes just above the eleventh level, cutting out the larger moiety of the lead. But the other ore-pipes and the ground continues dry on the eleventh and southwest on the twelfth. Northeast, the twelfth level is not yet opened through the pyrites. There is a little water and the pyrites are its work. The ground probably contains these ore-pipes its entire length, less than half of which has been exploited. From the twelfth level it is 1,600 feet on the slope of the vein to the surface.

The old Revere workings have left a rough chimney 400 to 500 feet deep; 146 lots of ore at one time taken out of this chimney—about 7,300 tons, averaged 45 per cent. lead, 22½ ounces silver, and $3 gold per ton. The second-class ore has since been worked out by lessees. Without doubt this pipe will be found to continue downward. It is twice as rich in silver as the ground further northeast. It appears that

the Brooklyn, although wrought for many years, has a long future o production.

The Yosemite lies 300 to 400 feet north of the Brooklyn, on a paralle and very similar ledge, of which it takes 2,400 feet on its course. Th works are above the Brooklyn works, in Yosemite Gulch, and consist o a steam-hoist, concentrating mill using pigs equal to dressing 40 ton of material per day into 8 tons of concentrates, shops, offices, and al needed buildings and conveniences.

The workings consist of an incline, about 600 feet from the northeas end of the mine, dipping 36° from the northwestern horizon, betwee 500 and 600 feet deep, with four levels opened each way about the sam distance, the fourth level being about 400 feet from the surface; and above these, adit tunnels into the rising ground on either hand, openin to the surface through shafts and inclines, and connected one with an other by winzes. The southwest 800 feet is virgin ground. About 15(tons of ore per month, first class and concentrates, are being taken out and shipped by wagon to Sandy. More than half of it is first class, 55 per cent. lead and 18 ounces silver per ton.

There are five or six ore-pipes in the length of ground broken, dipping in the vein from the southwest 45°. One-fifth of the vein on its strike is ore-pipes, varying in thickness from 3 to 20 feet. Twenty to 30 men are employed. Although the Yosemite has been worked for fifteen years, and has put out $900,000, it has never been crowded. There is water, probably only a vein crossing the ledge with the gulch, and some pyrites of iron down the main incline, but off a little way on either hand it will be dry and the ore free to as great a depth as in the Brooklyn, giving stoping in free ore 1,500 to 1,600 feet deep.

The Lead mine is a location on the Yosemite ledge, in the next or *Lead Gulch*, northeast. It has an iron tramway of 4½ miles to its concentrating mill in Lower Bingham, and its ores go via the tramway and mill to the Bingham Cañon Railroad. The property takes the ledge for 3,000 feet on its strike, which is north 70° east. The ledge dips 45° from the northwestern horizon, and has a succession of ore-chimneys of unusual dimensions, dipping 45° from the west in the vein. The hoist and shaft are 750 feet from the east end of the property. The shaft is 350 feet deep, 70 feet below the fourth level. Levels 1 and 2 have not been opened, nor any of the levels east of the shaft. Westward the ground rises fast. The second level, starting from the 160-foot station, will have 700 feet of stoping above it, 1,300 feet west. Two ore-pipes have been cut by this level, and also by the fourth level, 120 feet lower. The mine is turning out 10 tons of 50 per cent. and 70 of 18 per cent. lead ore per day. The latter is concentrated into 20 tons, grading with the first class. Ninety per cent. of the lead is saved, but one-half the silver escapes in the water. The ore averages 7 ounces silver and $3 gold per ton. Product of mine and mill is 30 tons a day, first class and pigged, worth $20 a ton, and costing, at the Hanauer smelter, in Jordan Valley, $9.65 a ton.

The Lead Mine Company owns the Hanauer smelter, on Big Cottonwood, 6 miles south of Salt Lake City, and a sampling mill and accompanying buildings, machinery, and conveniences. The mill has a daily ore capacity of 50 to 60 tons, and is run by water. The works are connected with the mine and outside world by railroads. The Lead mine furnishes the flux for reducing ores of all kinds bought in the Salt Lake market. The production of the Lead mine for 1884 was, gold, 600 ounces, valued at $12,400; silver, 48,000 ounces, valued at coining rate, $62,060; *total* production $74,460. The smelters produced in 1884, 6,195 tons of

bullion, carrying an average of 105.2 ounces silver and 0.345 ounces gold per ton. The agent reports the production of the Hanauer (or Morgan) smelter during the year at, gold, 2,138 ounces; silver, 651,699 ounces.

The company has the option of three or four other mines near the Lead, on which it has recently placed a steam-hoist and commenced development. These claims have been connected with the Lead tramway by 800-feet of new line. About 115 men are employed at the mine, mill, and smelter.

The Old Telegraph mine is worked under lease by Hazelgrove & Mullett. Their lease has one year's life yet, but the mine is pretty well exhausted of free ores. They have a 5-stamp concentrating mill, with square buddles. Their ores have a quartz gangue, and it pays to dress them if 15 per cent. lead is found. When owned by L. E. Holden the Old Telegraph turned out from 60,000 to 70,000 tons of ore, which sold for about $1,500,000. The galena and carbonates bottom, however, some 600 feet from the surface, on almost illimitable beds of iron pyrites low in silver. M. Lavaguino, agent of the French company that owns the property, is about to sink 150 feet into these and see if they hold in character. The Old Telegraph is centrally located on the great lode of Bingham, and is a consolidation of twenty-one claims, covering a mile in length of the ledge.

Adjoining the Old Telegraph, on the southwest of the same ledge, is the Spanish. The ore-bearing formation here is 600 feet thick, and there are two well-defined ore streaks or channels. In these the pipes make with great freedom, so irregularly, in fact, that it is difficult to discover their system, if they have any. The mine is worked through tunnels run in from Bingham Gulch at different levels. The ore is quite base, yet rich enough in lead and silver to make it pay to mine. To the property belongs a 5-stamp concentrating mill, which is idle, the roasting of the ores on cord-wood out of doors being tried. It is thought that many of the pyritous ores of Bingham can be utilized in this way. Those that carry 15 ounces of silver or its equivalent should be.

The Nast and the Saturn, on the same ledge, are between quartzite and porphyry, at the head of Carr Fork. The owners of the Nast are working it, and they lease the Saturn of its English owners. The ore is galena, averaging 50 per cent. lead and 26 ounces silver per ton. The ore-pipe is 120 feet through, and is reached by an adit 400 feet long.

The Winamuck group—Dixon, Winamuck, and Savage—on which dead work ceased some years since, shipped 627 tons in 1884 out of the old workings and dump. These mines have never been prospected much below water-level, but above that they produced between $12,000 and $15,000, when, becoming partially base and lower in grade, work ceased. The ores are low in lead, but in silver and gold carry from $15 to $25 a ton. They appear to be well adapted to out-of-door roasting in heaps. It would not be strange if this treatment should furnish the means of making the Winamuck group productve mines.

The Jordan and its 60-stamp mill, on the Jordan River, was idle the past year, the owners seeking to find some treatment that will not waste two-thirds of the contents of the ore, as the stamp-mill does. The mine is nearly a mile long, and is crossed diagonally by the Galena, which, with the American Flag and the Excelsior, belongs to the property. It was at this crossing that 100,000 tons of lead-ore were formerly taken out, which sold for about $2,000,000, and it is here the immense body of gold rock lies. The owners are hopeful of finding some process of leaching with chemicals that will justify them in working out this deposit.

The South Galena is the southeast extension of the Galena, and, with the Live Yankee, covers the vein to the Aladdin, 2,000 feet. An adit to the Brown winze, 900 feet, is being driven, 100 feet below the old Live Yankee adit. It will be 350 feet deep at the winze and 1,000 feet at the southwest end of the property. The adit has turned out enough ore in the last 400 feet to pay for running it. At the Brown winze there is a large body of ore, and surface openings show it to be plentiful in the high ground to the southwest.

The Aladdin is worked by lessees. It has two strong ore-pipes carrying ores very rich in silver but poor in lead. A shaft is to be sunk between them and the property worked by the owner.

The Live Pine is a strong ledge, cropping out up and down the face of the hill, with which five or six adits have been run at proper intervals of from 300 to 600 feet. The ground, so far as opened, is almost all ore bearing and the ore is higher than the average in lead and silver.

The Silver Shield is a similar ledge to the Live Pine and is opened in the same way—by a series of adits. Both mines have a great deal of stoping ground above the lowest adit and are to be worked vigorously by the owners when the leases on them expire.

In the Stewart and Stewart No. 2 groups, large deposits of gold rock are in the same condition as in the Jordan—idle for lack of a process of treatment which does not waste more of value than it saves.

The Last Chance and Hooper, owned by the Flagstaff Company, has been reorganized in London as the "New Chance," and the ground, which formerly produced $75,000, is to be opened anew by a tunnel 2,200 feet in length, which is already in 700 feet, the object being to get a working base below the steepest grade and the region of deepest snows. The ores, so base as to have been comparatively valueless six or seven years ago, are now sought after. The tunnel is to be driven with machine drills, and will in a year be completed.

The Northern Chief, in *Black Jack*, south of Bingham, put up a leaching mill last spring, but becoming involved in debt before it got into operation, the mill was closed. The indebtedness has since been almost settled, and the mill, a good one of its kind, will in the spring begin work. It will pay to work the ores, even should they prove unfitted for the mill (leaching) process.

The Lucky Boy, same neighborhood, was formerly a producer of high-grade ores, but when the ores became base was practically abandoned. It is a contact vein and pitches into the hill at an angle of about 20°. A long tunnel catches it on its dip 525 feet below the outcrop, and a level at that point, as well as one 250 feet lower, develops three ore-pipes, which without doubt are continuous to the surface, all within a length of less than 500 feet, the property being 2,400 feet long on the strike of the vein. Exploitation has been going on three or four years. The mine is now prepared, if the owners desire, to ship in considerable quantity ores of good quality.

The Cottonwoods.—Shipments of ore from the Cottonwoods in 1884 were approximately as follows:

Mine.	Pounds.	Mine.	Pounds.
Joab Lawrence	750, 710	Silver Mountain	340, 000
Prince of Wales	750, 550	Richmond and Teresa	96, 700
City Rock	593, 760	Small Shipments	258, 110
Evergreen	176, 500	Kessler	40, 000
New Emma	141, 700		
Maxfield	900, 000	Total	4, 648, 220

The New Emma is worked through a shaft sunk from the Bay State tunnel about 1,700 feet in, and 700 feet below the surface vertically. It drops into the ore-bearing ledge 235 feet down. A level was opened from the 135-foot station, and was being exploited with encouraging indications, and a shaft had been sunk 100 feet further, when, in a terrible storm, March, 1884, the works at the mouth of the tunnel and 10 human beings were buried by an avalanche. More money was raised by the London owners, new machinery placed, and the 235-foot level exploited. The ledge is from 150 to 250 feet thick, and its thorough exploitation, even on one level, is a work of time. The owners are hopeful of finding a new ore-body, a thin streak of rich ore having continued from the surface bonanza which created such excitement in former years.

The Joab Lawrence, next northwest of the New Emma on the ledge or belt, is mainly worked from the Burgess tunnel, a working incline starting down on the ledge from the tunnel, 700 feet under cover, and going down 230 feet. From this, at intervals of 100 feet, two levels have been opened, the 100-foot level nearly the entire length of the property, 1,500 feet, the 200-foot level somewhat less. From these the ore-pipes, that cross them and the ledge at about a right angle, are worked. The ores go on a wire tramway from the mouth of the tunnel, where steam is made for the hoist, to the Rio Grande Western depot. First-class ore averages 45 per cent. lead and from 125 to 200 ounces silver per ton. The property has paid dividends to its owners for the last five years, and it looks better now than ever, the workings having recently passed through a bad piece of ground in the lode and found the ore and everything beyond acting in all respects as it did above the disturbance.

Next northwest of the Joab Lawrence is the Flagstaff, which is said to have put out more than $5,000,000 between 1871 and 1879, inclusive, and from within 1,000 feet of the outcrop. The company is being reorganized in London for the second time, and prospecting for new ore-bodies is to be undertaken. There is a general expectation that this lode will soon enter on a second producing stage from end to end.

The Eclipse, northwest of the Flagstaff, on the Big Cottonwood side of the ridge, was idle in 1884.

The City Rock, a consolidation of several claims, is on a fissure striking through the limestone ridge of Silurian age which sweeps round above Alta, dividing the Little from the Big Cottonwood. It is opened by a series of adits from the bottom to the top of the hill, about 250 feet apart, connected by winzes supplied with ladder-ways, and ore and waste chutes, and the ground largely opened by intervening levels or drifts on the vein. The two upper adits have reached the eastward of the property; the third and fourth have 600 and 500 feet respectively to run before doing so. The fourth starts in from Grizzly Flat, not far above the Emma, and when run through will be 2,600 feet long and 1,000 feet under the outcrop at the east end; it is now in 2,100 feet. The ore, galena and carbonates, occurs in chimneys, and is graded to bring $40 per ton at the smelters. Cost of mining and marketing is from $12 to $15 per ton. The mine is admirably opened and equipped for economical working.

The Antelope and Prince of Wales is on the divide between the two Cottonwoods, cuts straight through it, and the bedding of the formation like the City Rock, from which it is a few hundred feet north. It is opened long and deep by shaft and levels and has a record output of more than $1,000,000. It is worked, like all the mines of the district, in a comparatively small way, but at a profit. The Richmond & Teresa is near by, and is much the same kind of a mine.

The Emma belt continues across the Big Cottonwood northwest. The Maxfield takes it northwest of Argenta Post-Office. It has an ore-chimney which has been followed down 950 feet. Formerly it paid dividends, but none during 1884, the ore running base. Late in the season it broke through this base, striking its old galena and carbonate ore, and at the same time a considerable flow of water. If this latter one holds, the dividends of 1883 promise to be resumed. The ores are wagoned to the smelters in Jordan Valley. The ores average 35 per cent. lead and 60 ounces in silver per ton.

The Silver Mountain is on the Emma belt, between the Maxfield and Kessler's Peak. The shaft is intersected at a depth of 350 feet by a tunnel 600 feet long, which continues on the vein, with ore in and out the entire distance. A winze is going down below this level. The workings ran into borasca the past season and the mine was leased. It is said to have recently changed for the better. The ore sells at the smelters for about $36 a ton. Total output to date, 1,170 tons.

Nothing was done on the Reed and Benson the past year, and but little on the Kessler. Some tunnels are being slowly but steadily excavated in *Little Cottonwood* and some prospects developed. Part of the old Carrie Steel mill, at Camp Floyd (10 stamps), is being set up at the mouth of Little Cottonwood Cañon with the idea of working the low-grade ores of the McKay and Revolution and other mines. In both the Cottonwoods about 160 men are employed.

The smelters: The Horn Silver, 5 stacks; the Hanauer, 2 stacks; and the Germania Lead Works, 3 stacks, are within a mile of one another, on the Big Cottonwood, 7 miles south of Salt Lake City. They are also on both the Utah Central and the Rio Grande Western Railways, and are connected with all the mining districts of Utah which are now producing, save Silver Reef. The Mingo, 4 stacks, is at Sandy, 5 or 6 miles farther south, but otherwise situated in all respects like the others. The Horn Silver ran all its stacks the past year on its own ore, the Hanauer ran its 2 stacks pretty steadily, the Mingo ran 2 stacks, and the Germania 2 only; 11 stacks in all. Their output is given in a preceding table. The Germania has a $150,000 plant for manufacturing lead products, as white and red lead, litharge, lead pipe, and granulated lead for assayer's purposes. Smelting elsewhere in the Territory has been abandoned. The 11 stacks run steadily the past year smelted ores, inclusive of 750 tons of matte or slag from the old smelter dumps at Frisco, as follows:

	Tons.
Beaver County:	
Horn Silver	39,185
Cave	1,364
Carbonate	693
Other mines	459
Matte or slag	750
	42,451
Juab County:	
Tintic mines	22,944
Salt Lake County:	
Bingham mines	24,787
Cottonwoods	2,024
	26,811

	Tons.
Summit County:	
Crescent	15,359
Ontario	1,716
Sampson	537
Other mines	300
	17,912
Tooele County:	
Stockton, and other mines	2,905
Mines of other counties	2,840
Total smelting ores produced and received	115,863
Less ores shipped out of the Territory	24,083
Balance smelted	91,780

The product was 4,514 ounces gold, 2,835,462 ounces silver, 6,840,000 pounds pig-lead, and 48,100,435 pounds base bullion. Deducting 5 per cent. of the base bullion and 3 per cent. of the silver in it for loss in refining, we have 52,535,414 pounds pig-lead and 2,762,990 ounces silver. The silver credited to the Germania lead works has been mainly separated from the bullion. Rating gold at $20.67, and silver at $1.10 an ounce, and lead at $3.73 per cwt.=$5,092,163, or about $55.50 per ton of ores smelted.

SUMMIT COUNTY.

Ores reduced in and shipped from Summit County the past year were approximately as follows:

Worked in Ontario mill	dry tons..	23,157
Ontario ores shipped and sold	do...	1,714
Crescent ores shipped	tons..	15,361
Sampson ores shipped	do...	537
Other mines shipped	do...	300
Total reduced and shipped		41,069

The interest in the Ontario's operations the past year gathers about the extension and success of the sixth level drain tunnel, the opening of the new ground west, and the opening of the ninth level at shaft No. 2. The drain tunnel is 6,188 feet long to its intersection with shaft No. 3, and 424 feet farther, straight ahead, it cuts the vein. It was continued a few hundred feet further yet on its course and about 150 feet south of the vein, in the loose, quartzite, foot-wall country rock, lateral branches were started east and west. The latter has been driven 2,200 feet, and will in a few months connect with a drift from the 840-foot level of the Daly ground. The east lateral has been driven east 2,000 feet and 800 feet south from near the east end, in a belt of loose, wet, white lime. Total length of tunnel and laterals is about 12,000 feet. The mountain circles round the vein, save on the north, and rises considerably higher. It is full of surface water, which the drain tunnel draws off down to its level, reducing by so much the pressure in the deeper workings. Of the 6,300 gallons a minute flowing out of the tunnel it catches 3,900 gallons; 2,400 are pumped up from lower levels to the sixth. Eight thousand feet of new openings, inclusive of sinking No. 3 shaft 180 feet, were made in the mine during 1884 from No. 3 shaft, and 4,000 from No. 2 shaft. The levels from the fourth to the eighth, inclusive, have been connected between the shafts, which are 1,100 feet apart in a direct line, and the following table shows their length east and west of shaft No. 1, which is about 1,000 feet from the east end of the

property; also amount of ore taken from each to middle of last November:

Levels.	East.	West.	Total.	Ore.
				Tons.
First	700	1,325	2,125	.....
Second	700	450	1,150	570
Third	650	450	1,100	.....
Fourth	750	1,800	2,550	261
Fifth	700	2,400	3,100	1,241
Sixth	918	3,020	3,938	2,968
Seventh	550	1,400	1,950	2,336
Eighth	635	1,800	2,435	4,740
Ninth	300	600	900	367
Total tons ore				26,503

This indicates an output for the year of about 29,000 tons, of which 11,000 came from No. 3 shaft (new west ground). The different levels were opened west of No. 3 shaft at the end of the year approximately as follows, namely:

	Feet.
Fourth	650
Fifth	1,250
Sixth	1,950
Seventh	300
Eighth	650

The workings so far indicate about 1 foot of ore in 3 linear feet on the vein west of No. 3 shaft. From the sixth several raises have been made to the fifth and fourth for ventilation and for working purposes.

In shaft No. 3 the Cornish pump, columns, and rod were extended from the sixth to the eighth level early in the year 1884. The stations are being chambered out for their extension to the tenth level. The floor of the car station is 1,048½ feet below the collar of the shaft; the steam-pump station (for relay in case of accident) is next under the car station; then comes the Cornish pump station. After the pumps are in place the shaft will be sunk 25 feet more, making it 45 feet below the floor of the car station, and there it is likely to rest some time, as there is a great deal of ground to be worked above the tenth level. The vein has not been cut from this shaft, neither on the tenth nor ninth levels, and will not be till the pumps are placed. The shaft has been in very hard ground for 100 feet. It could hardly be sunk at all without machine drills. Twelve of these are used in the mine.

The ninth level has been opened at No. 2 shaft, 300 feet east and 600 west. The shaft and the vein near it are in heavy, swelling ground (porphyry). Going east the vein is at first freaky and bunchy, but it reaches good ground in about 200 feet and the ore comes in nicely. West the first 300 feet is fair stoping ground; beyond for some distance it is less encouraging; cross-cutting to the other wall may show it to be better. It is too soon to pronounce on the character of the mine at this the deepest level. So far as opened it is regarded as better, on the whole, than was the eighth over it.

At the mill 20 stamps were idle two weeks in the fall for repairs, and this was all the detention during the year. It reduced during the year (part of December estimated) 23,157 tons of dry ore, product of which sold for $1,890,919.76; and there were sold and shipped (about two-thirds of it East) 1,713¾ of dry ore, for $169,322.20—24,871 tons reduced and sold, bringing $2,060,241.96. From the organization of the Ontario Silver

Mining Company and the starting of their mill, February 1, 1877, to December 31, 1884 (December partly estimated), 137,315 tons of dry ore have been reduced and sold, bringing to the company $13,539,981.69. Prior to that the Ontario Mining Company had realized $1,014,596.96, representing (assuming that the ore graded the same as all the ore has since) 10,290 tons of dry ore. The total output of the mine to the end of 1884 is therefore 147,605 tons dry ore, which realized to the company $14,554,578.65=$98.60 per ton. The mine paid its one hundred and second dividend of 50 cents per share (64 on 100,000, 38 on 150,000 shares; in all, $6,050,000), December 31, 1884=$51 a share on the old shares, $19 on the new shares.

Four hundred and fifty men are carried on the pay-rolls of mine and mill, at an average of $3.50 per day. The mine used 15,000 tons of coal in 1884; 440,000 feet of lumber were bought, at $25 per thousand; 220,000 running feet of round timber, at 6 cents per foot; and 45,000 lagging at 6 cents each. The mill reduced 65 tons a day, using 15 tons of coal and from 15 to 20 cords of wood. The first costs $4.50 per ton; the last, $5 per cord. The wood is used in the dryers and the Stetefeldt furnaces.

Mr. R. C. Chambers, the superintendent, has had to contend with great difficulties, but they have been surmounted and a splendid success has been wrought. The water at last is well in hand, the mine well equipped, the ground acquired, and the ore has proved continuous (in pipes, as in all mines) for a mile in length, 4,000 feet of which are opened by at least one level, the sixth. The cost of mining has been largely reduced and the treatment of the ores brought almost to perfection. The mill worked 2½ per cent. closer the past year than ever before—up to 95 per cent.—and it is refractory ore. Actual cost of mining per ton is figured at present at $12.09; of milling, at $14.27; of hauling, prospecting and dead work, repairs, and general expense, at $5.43; total, $31.79. A great deal of new ground was opened in 1884, and high expectations are entertained of the future of the mine from the developments in the new west ground and in the ninth level east. The business has been brought into a shape where better results will be realized from the same expenditure.

The Daly ground, belonging to a new organization called the Daly Mining Company, takes the vein next west of the Ontario ground for 1,500 linear feet, crossing Sawmill Gulch. After running tunnels from the gulch southeast and southwest 1,000 and 1,100 feet, respectively, to locate the vein, drifting and sinking from the first tunnel, a shaft was sunk 600 feet, designed to cut the vein from 800 to 900 feet down. The sixth level was cut by drift from shaft last summer, and the flow of water compelled the putting in of pumps. By the time they were set the water had drained off, without doubt through the Ontario workings. The sixth level has since been opened 200 feet or more east and the same west. The vein most of the way averages with the Ontario vein for strength, and so far it is all good stoping ground. A shipment of 74 tons sampled 8 per cent. lead, 203 ounces silver, and $6 gold per ton, but the ore on the whole is expected to grade with the Ontario, about $100 per ton. Sinking the shaft was recently resumed. It will be sent down at once to the eighth level, 240 feet below the sixth, which will then correspond with the Ontario sixth, on which the west lateral drain tunnel is being driven back of the vein. Connection will then be made with the tunnel, and as the vein dips at an angle of 45° and the ground rises in altitude either way from the gulch, there will be 1,200 feet depth of back above the Daly eighth level.

Probably the ground can be mined at 20 per cent. of what it would have cost but for this drainage facility. The shaft is equipped with steam-hoist, and the works are complete; pumps, compress for machine drills, ore-house, and other buildings and shops are located near the linear center of the ground. Water is flumed underground from a mill-site 1,500 feet north belonging to the property. The shaft is 3,200 feet direct from No. 3 Ontario, west by south. This proves that the Ontario vein persists a distance of quite 6,000 feet, and it gives a new value to the ground on the strike of the vein still west and east as well. The Daly Mining Company starts under very favorable auspices and the mine will add materially to the output of Utah.

East of the Ontario the Parley's Park Company, after expending $200,000 hunting for the Ontario vein extension, have shut down. Their working shaft, within 75 feet of the Ontario east end, reached the tenth level, and they had permission to connect their ninth with the Ontario sixth for drainage and air; but they required new plant, and had to raise more money or suspend, and they chose the latter.

Still further east nothing is doing on the Clara, the Lowell, the McHenry, the Hawkeye, the Boulder, which locates the Ontario ledge, it is supposed, nearly down to the lowlands bordering the Provo River, more than 8,000 feet. Efforts are being made to raise the means to drive an adit tunnel on or near the ledge on a level with the Ontario fourteenth level. A length of 13,000 feet would carry it to the Ontario workings, and this can be excavated, with the improvements in explosives and machine drills, from one face, at the rate of from 500 to 600 feet per month, the rate achieved in driving the headings of the Arlberg tunnel, in Austria, in the last years. It would develop the supposed Ontario ledge for nearly 2 miles, and drain and give access at great depth to a large area of promising mining ground.

The Crescent is a lead-silver mine 2 miles west of the Ontario and 2,000 feet higher. The following comparative statement of ores sold from the the Crescent in 1883 and 1884 (years ending with October), receipts on account of disbursements, cost and profits per ton, &c., is from reports made to the stockholders by officers of the company:

Items.	1883.	1884.
Ores sold ..... tons..	11,574	12,748
Received for same	$346,148 49	$245,686 62
Received per ton	29 92	19 27
Total cost of	198,908 95	162,545 30
Cost per ton	16 77	12 75
Total profits on	152,239 54	83,129 62
Profit per ton	13 15	6 52

Value received was $3 per ton less in 1884, because of the lower price of lead. There was still a reduction in grade, however, due in part, perhaps, to less careful selection, of $7.65 per ton, or about 25 per cent. More than half of this loss was made up by a reduction of $4 per ton in expense.

The property comprises 90 acres. A concentrating mill of the capacity of from 80 to 100 tons a day, and 5 miles of tramway between mine and mill, were built the past year, at a cost of about $45,000. With this additional plant the expense of production will be further reduced, and 40,000 tons of dump or pigging ore, already mined, made available. The first lot of concentrates sold at the mill at $38 a ton. The dump

ore will make 10,000 tons of concentrates, worth, net, $400,000, and 1,000 tons a month (250 tons of concentrates) is added to this dump ore. The concentrating mill is at Park City, on the railroad; jigs and McKim tables are used.

Crescent or Pinyon Hill is a ledge on the east, a long, smooth, rapid descent toward the northwest. The ores make in bodies about 100 feet under the surface, descending generally with the hill, but in steps, pinching in the vertical breaks, opening out on the landings. There are various old workings on top of the hill, on the east and south. The Rebellion workings enter by tunnel low down the northwest slope. These have developed a series of ore bodies, striking east, extending from 1,000 to 1,200 feet, and rising, by successive steps of from 15 to 30 feet, 125 feet in that distance. A dike of porphyry, with a strong vein of quartz giving fair assays overlying it (pitching a few degrees south from the vertical), and striking nearly with the line of the Rebellion workings, and 200 feet or so north of them, is supposed to limit the ore-field in that direction. There are 1,200 square sets, 5 feet square by 6 high, in the stopes, on the bed-rock, with a second story above them. There are fine breasts of ore on all sides of more than half the stopes, and there are large areas of ground on the right and left practically unexploited. There are many interesting features about the ground. The Extra tunnel, 175 feet under the Rebellion tunnel, is in 1,700 feet and near the strike of the Sampson contact, where the extension of the Sampson, a nearly vertical contact vein of high-grade ore, is expected. The vein of quartz lying on the porphyry north is also noticeable, and the ground beyond or north of the dike itself. About one-half the ore requires to be dressed. One hundred men are employed at mine and mill. Wood costs $3.50 per cord; mine timbers 6 or 7 cents a foot. The top of Crescent. Hill is 10,000 feet above the sea, and everything for half the year is moved on runners. For this reason the tramway cannot be used in winter, and the concentrating mill also ceases.

The Apex has twelve patented claims adjoining the Crescent on the south. Work the past year was mainly in a tunnel 400 feet or more below the ore-bearing formation. A tunnel at the right altitude opens into a field of ore resembling that of the Crescent, in fact a combination of it. Various openings here expose large bodies of low-grade and considerable shipping ore. With a concentrating plant the Apex would be outfitted to make dividends.

The Bon Homme property, north of the Crescent, on the same slope of the same ridge, at a depth of 150 feet, shows encouraging indications. This comprises operations on Pinyon Ridge the past year.

The Sampson steam-hoist is about 200 feet east of the base of the ledge, 400 feet high, that forms the east face of Crescent Hill. The Sampson vein strikes east and west, pitches slightly to the south from the vertical, and, outcropping east of or under Crescent Hill, is supposed to strike directly through it and to be in or near a contact of lime and quartzite. The shaft is 300 feet deep; the first level, 200 feet down, is opened 300 feet west and 80 east; the second level, 100 feet lower, about 50 feet each way; above the first level the stopes are 150 feet long. The ore is galena and carbonate, somewhat scattered and bunchy as yet, but giving earnest of a good mine at greater depth. The 537 tons shipped the past year netted, exclusive of cost of mining, $65.50 per ton. Important additions were made to the hoisting plant last year.

The Keystone, Silver Key, Utah, and White Pine were idle the past year. The Empire was reorganized in the spring, but operations have

not been resumed. Good indications have been struck in the P group, a mile west of the Daly ground. Hopes are entertained will catch the Ontario vein, the contact between the quartzite an in which it is found being easily traceable to that neighborhood. dispute about titles prevents aught being done to test it.

TOOELE COUNTY.

Stockton district.—There is a slight revival in mining at *Dry* and *Ophir*, and a few hundred tons of ores from those districts fig the shipments for 1884, but most of the output of the county wa Stockton district. Shipments were as follows:

	Pou
Honerine (Stockton)	4,
Kearsarge, &c. (Dry Cañon)	
Monarch (Ophir)	
Utah Gem (Ophir)	
Sundry mines (shipments of 34 parties)	
Total	5,

Interest in the Stockton district clusters mainly round the succ working of the Honerine property by Mr. C. E. Mitchener, and consolidation and opening of the Calumet and Hecla group by Mr. Karrick. The Honerine is a consolidation of the Great Basin and National, covering 1,810 linear feet of ledge, of which 1 foot in 5 ap to be ore-pipe. The vein strikes diagonally across these loca but it remained for Mr. Mitchener to discover it and bring abo amicable consolidation.

The vein strikes east and west and dips from the northern ho 68°, keeping over or under or in a stratum of blue lime, whi both over and under laid by a whiter lime. Two dikes of porphyry across the property. The vein is quite regular and filled betwee ore-pipes with a very short lime, as if it had been crushed. It mile or so east of Stockton, 1,000 feet above Rush Lake and 70 above water-level. The ore-pipes have a uniform pitch to the w the vein of 33° from the vertical.

The Great Basin incline, at the east end of the property, follo fine ore-pipe down to the seventh level, 600 feet vertical, taking o it $300,000. Extending the lower levels west they cut another ore which turned out $100,000. This was outside of the lines of the ration, and when convinced of this they entered the new combi with their fraction of the ground, steam-hoist, working incline, an centrating mill, taking one-third of the stock (Honerine).

The lower levels have been driven further west, cutting four o more ore-pipes in a distance of 700 feet from the foot of the incline this point the sixth level has 250 feet to go and 75 feet to raise t nect with the old First National workings, which are little more working incline, and beyond this it is 400 feet to the west end property. There is every reason to suppose this ground as good a already opened, and above the seventh level there is an average of 700 feet of stoping ground. Sixty feet below it is the water but there is not much water in the ground, and it is expected tha ites of iron will but partially replace the galena.

First-class ore is 67 per cent. lead and 37 ounces silver per ton. tons out of 8 require dressing. This averages 18 per cent. lead ounces silver. Three and one-half tons are reduced to 1, averaging *cent.* lead and 28 ounces silver. The tailings contain 4½ per cent

nd 2 ounces silver. The concentrating mill, with its jigs and shaking ables, is the pioneer mill of the kind and one of the best in Utah or daho. It makes 9 tons of concentrates in ten hours. Shipments at resent are at the rate of 300 tons per month. About 35 men are em-loyed. Cedar wood costs $3.50 per cord. The Honerine paid dividend No. 1, of $12,500, in November last. The ledge has not been proved to ontain ore-pipes of importance east of the Honerine, but perhaps it is ecause the exploiting has been on too small a scale or not well di-rected.

A $20,000 shaft on the Quandary, next east, developed nothing and proved nothing, save that there was no ore in the length of the shaft, 10 or 12 feet. Horizontal work is needed on these veins filled with ore-pipes along with the vertical. The seventh level has been driven 400 feet east of the working incline, finding nothing; but further work in that direction, will no doubt result differently. The vein is located by the blue-lime stratum and occasional indications on the surface a mile or more east. West the Legal Tender takes it for nearly 2,000 feet. A shaft 350 feet deep, 800 feet from the Honerine, turned out 1,400 tons of ore, 52 per cent. lead and 25 ounces silver, and there was almost no drifting. From work on the surface the ore-pipe seems to be 350 feet long. Most of the ore requires dressing.

The Calumet and Hecla group is 2,000 feet south of the Honerine. The formation is remarkably mineralized, shot through in every direction by strong veins of ore for a width of 300 feet and a length of from 500 to 1,000 feet. Nearly a dozen different parties in former years mined and shipped ores out of a hill-side not more than 20 by 30 rods in area. It was before the art of dressing lead ores was learned. As the jigging ore then was, 9 out of 10 tons were left as worthless, and the veins themselves were lightly held. The Calumet and Hecla groups have been consolidated as the Calumet. The property covers the main ledge, including the concentering and crossing veins, a length of 3,600 feet.

The workings are west of the linear center of the mine, at a point where a series of veins center and run into and cross one another, and where the surface for about 4 acres is almost nothing but cuts, dumps, drifts, shafts, and excavations of all shapes and dimensions. In the web of veins there is an average of one ounce silver to each hundred-weight of lead. The workings are on the Calumet, and show that it strikes east and west and dips from the northern horizon 78°. They develop an ore-pipe 100 feet long to a depth of 300 feet, the ore averaging 4 feet thick everywhere, save in a dike of porphyry which, about 90 feet underground, breaks the pipe in two sections on its strike. Three-fourths of it is jigging ore, 20 per cent. lead and 20 ounces per ton silver. The other one-fourth is three times as rich in both silver and lead. A steam-hoist is to be put on, the main incline sunk to the water level, 700 feet, levels opened out, and a concentrating mill built equal to dressing 100 tons a day. It is assumed that the ground contains several ore-pipes as good as the one opened, and the Calumet bids fair to be a large producer in the near future.

The Queen of the Hills Mining Company, reorganized in Salt Lake a few years since, has leased the Queen of the Hills Mine, at Dry Cañon, and is working the Silver King No. 2, lying north of the Honerine, through an incline 450 feet deep. The ore is low grade and requires a concentrating plant before much can be accomplished. The few main

veins of Stockton district crop out for 2 miles in length. They are crossed by a series of smaller veins, acting as feeders.

At Ophir the Chloride Gem group has been consolidated, a steam-hoist provided, and work begun in a workmanlike manner. The main ledge is a contact between lime and slate, the latter overlying. Into the lime foot-wall country rock several small veins open at a right angle with the contact. These were formerly owned and worked separately, and the work ceased when the high-grade ore in the mouths of the pipes was exhausted. The workings are an incline, equipped with steam-hoist and a level at a depth of 250 feet. High-grade ore, 100 ounces or more per ton, is being taken out, although not in large quantities. This, perhaps the first mining ever done in Ophir, is regarded with great interest by the mining fraternity. It is thought that there has been too little opening of veins on their strike for the vertical openings made, a great mistake where the ore makes in pipes, many of which do not outcrop. A miner sinks in one of these pipes perhaps 600 feet, getting enough to pay his way, or a little more, and then quits precisely when he ought to begin to mine by opening out a level at the bottom of his shaft or incline and cutting other ore-pipes, which could be worked out with comparatively great profit.

Nothing was done in mining at *Deep Creek*, Tooele County, in 1884.

The Havana property has plenty of rock carrying from 30 to 50 ounces silver per ton, but it has been impossible to raise money to put on the plant necessary to work it.

UTAH COUNTY.

At *American Fork*, Utah County, some assessment and development work was done, but no ores to speak of were produced or marketed. The surface workings of the Silver Bell stopped, at a depth of 400 feet, in a large body of about 40 ounces dry ore.

An adit was begun 2,100 feet from the shaft and 1,200 feet vertically below it. The Treasure, including the Dolphin, has been opened by shaft 185 feet deep, and several short drifts off the shaft, all in ore. A ton of galena from the foot-wall sampled 414 ounces silver, $6 gold, and 29 per cent. lead. The Cariboo Mining Company (Salt Lake) is developing a group on *Mineral Flat*. Several of the veins bear high-grade ore, but not in large quantity.

WASHINGTON COUNTY.

Shipments of fine bullion from the two companies, Stormont and Christy, at work at Silver Reef, for 1884, were 234,217 ounces. The Stormont is stoping on all the levels from the second to the sixth, inclusive, and sinking for the seventh level is under way. The ore averages about 20 ounces per ton, and total cost of mining, hauling, milling, dead work, and repairs is given at $12.75 per ton. Eighty per cent. of the value is saved. The bullion runs from 800 to 950 fine. About 90 men were employed. From July, 1879, to the end of November, 1884, the property, and mainly the Buckeye and Savage claims, has produced 1,404,976 ounces silver, from 74,300 tons of ore, and paid $145,000 in dividends.

The Christy Mill and Mining Company has been succeeded by the Christy Mining Company. It was idle two-thirds of the year, but is now turning out 20,000 to 25,000 ounces silver per month. In seven years to December 15, 1884, it took out 1,851,484 ounces of silver. Its

dividends are not known. It is safe to estimate its profits at one-third the gross yield, or at the rate of about $100,000 a year.

The Barbee and Walker has followed the Leeds into summary liquidation under the sheriff's hammer.

The *Tutsagubit district*, Washington County, boasts of a mountain of soft lead ore, of rather low grade, owned by the Mountain Chief Mining Company. It is 25 miles from Saint George, and the 1-stack smelter built the past year, to smelt the ores, is on the Virgin River, 85 miles from the railroad at Milford. The property may prove a second Horn Silver, but it is doubtful if it can be worked unless the railroad is extended to or near it.

CHAPTER XII

WASHINGTON TERRITORY.

Many believe that mining for the precious metals in this T has a promising future, and that with better facilities its numer and silver bearing ledges, which have been but slightly worked developed and add materially to the production of the precious

In addition to deposits of gold and silver the Territory posse mense coal fields and iron and marble in abundance.

Messrs. Wells, Fargo & Co. stated the production of the pa to have been as follows:

Gold carried by express	
Gold carried by other conveyances	
Total gold	
Silver carried by express	

This is a slight increase over the preceding year, as estimated same company.

The amount of gold deposited at the San Francisco mint du year, credited to this Territory, was $34,878, which is conside an increase over the previous year. It is estimated that of the bullion deposited by Messrs. Selby & Co. at the San Francis during the year at least $50,000 was from the mines of this Te which would indicate a production of over $86,000. From t and information in my possession, I have estimated the produc 1884 to have been: Gold, $85,000; silver, $1,000; total, $86,00

The review of this Territory was prepared by Mr. A. M. La San Francisco.

CHEHALIS COUNTY.

Some rich mines have been discovered in the eastern portion halis County. Specimens of silver-bearing quartz have been and found to yield from $100 to $1,300 per ton. A bed of an coal was also found.

Scattered over the Territory are quite a large number of Chin in many instances are making good wages. There are 9 Chi ners working a very profitable claim on the west bank of the Co 11 miles above the mouth of the Wenatchie. Their average d is $1.50 to the man. The claim has been worked by them for t twelve years. Both banks of the Columbia are good for gold d and are worked by Indians and Chinese throughout the entire of bars, from the Nez Spielum to the San Poel.

There are 5 Chinamen at work on the east bank of the Colu posite Whitestone reserve. There are also 20 Chinese miners between Hawk Creek and Camp Spokane, on the east bank of

lumbia. This is an old, well-paying claim, with valuable deposits of fine gold in direct wash from the Cœur d'Alène and Spokane Rivers.

In *Rock Creek mining district*, near Kettle River and between Lake Soogoos and Kettle Falls, near the British Columbia line, there are nearly 200 Chinese at work, with Indians and other old frontier miners. This is an old mining district, equal in extent to that of the Kootenai country. Average daily pay is about $2.

KITTITASS COUNTY.

Cle el-um district.—A correspondent from Ellensburg gives the following interesting facts concerning the Kittitass mining region:

"The Cle-el-um mining district comprises the mineral lands lying east of the summit of the Cascade Mountains, and, generally speaking, that between Mount Stuart on the east and the Snoqualmie Pass on the west. The discoveries thus far made yield gold, silver, nickel, and copper, and may probably be called smelting ores.

"Prospecting has thus far covered but a limited portion of the district, and the surface only has been examined. The principal properties now under location are the Copperhead, Bullion, Centennial, Black, Honeycomb, True Fissure, and what is called the Hawk. These prospects are well defined upon the surface, and yield by different assays from $17 to $400 per ton, in about equal proportions of gold and silver, 3 to 80 per cent. copper, a trace to 36 per cent. nickel, and $2.50 to $2,000 per ton of silver. Last season was principally occupied in tracing these lodes and making locations. But little is known of the character of these ores at any depth, except as to the bullion, in which at 10 feet the ore has changed from $3.50 per ton in silver and 80 per cent. copper to 40 per cent. of copper and 13 per cent. of silver sulphurets. A huge magnetic iron lode runs through the entire district, in proximity to what is known as the red or porphyry formation, and between these the Copperhead lode has been traced from the Cle-el-um River 6 miles northeast to contact with the granite formation at Mount Stuart.

"At several intervening points the Copperhead comes squarely to the surface, always with black oxide of copper on top, and developing into copper glance or gray copper at limited depths. All along this lode, at different points, are croppings sufficiently massive to supply an ordinary smelter for years. The value of these mines is much enhanced by the abundance of good timber and the large supply of water that is found throughout all the mining camps in this county. As there are no means of transportation at command, reduction works will have to be erected contiguous to the ore-beds, where the metal can be extracted economically, until such time as facilities for shipment are afforded that will not absorb all the profits in the handling of the crude ore."

The Bullion Mining Company have their incline shaft at the depth of 140 feet. Good ore continues all the way down.

The ore of the Silver Bow contains copper pyrites and oxides, the assay value of which is from 40 to 50 per cent. copper and about $35 per ton in gold and silver. The ore-bodies vary from 3 to 8 feet in thickness.

Between the Cle-el-um mining district and Kittitass Valley are the *Pechastin* and *Swauk mining districts*, as also the recently discovered *Teneway coal fields*. In the former district one 6-stamp mill and 3 arrastras have been running for some six years on gold-bearing quartz which has averaged from $20 to $30 per ton in free gold. Thus far the property has been in the hands of inexperienced persons, who have been

content to work the ores for the free gold, while the rich sulphure gone down the creek. This season they put up a new mill, wit complicated machinery, for working the base ores, and for o discovery owners have sunk to a sufficient depth to give ther year's run in their mine. This district is 40 miles from Ellensbu

Swauk mining district.—This district, which is 25 miles from Elle shows several good properties, the principal being developed reddish-brown formation running through the entire district i and developing at several points into veritable mountains of Immediately upon the Homestake lode lie what are known as the placers. From one creek claim some $50,000 is estimated to ha taken out, and from the contiguous high bars nugget gold h drifted out weighing in single instances as high as $250 and value. Eleven hundred dollars in wire gold was taken from a crevice in one of the high-bar claims, and a man can make fro to $4 per day in the ground drifting for the coarse bed-rock gold

Three reasons have prevented the previous wholesale work these high bars: First, the gravel is from 8 to 30 feet deep, a is only found in the gravel where the wash is extra heavy; groun ing would not pay enough more to supersede the drifting proce ond, to procure and bring in water for hydraulic washing was ered almost an impossibility; third, men working the creek claim not allow the high-bar locations to tail into the creek, thus ma necessary to "crib up" their tailings, which prevented the profita of water for even ground-sluicing purposes. A company havi ceeded in securing the creek ground for dumping purposes, and number of high-bar locations, a survey was made and it was fou 4 miles of ditch or flume will bring water in abundance to a po feet above these locations, which, after being used at that point, carried to work upon a body of hydraulic diggings in Kittitas The quartz mines in this district are showing more good rock at than at any time since their discovery.

The Humming Bird has about 500 tons of ore in sight that w from $15 to $30 per ton in free gold. The lower level taps the l a depth of 125 feet, and in the west face of the tunnel the forma dicates nearness to the main chute. The vein in sight is 15 in width, of heavy sulphuret, with some free gold, while the sul carry from $80 to $300 per ton.

Adjoining the Humming Bird is the Bob-tail, the vein of whi average about 4 feet in width for a distance of 200 feet. Ab per ton in free gold is obtained from the ore. The company has a 6 mill on Pechastin Creek, near the mines, and has saved about 75 sulphurets and tailings, awaiting the erection of other machine is to be built for working base ores.

The Pole Pick mine has a good showing for becoming a payin erty.

The Golden Phœnix, the richest free-gold mine in the distri a ledge from 1 to 20 inches in width, and yields about $175 per free gold, while the sulphurets assay from $300 to $4,000 per to

In this county, in Cle-el-um district, bituminous coal in unl quantity and of superior quality abounds. The surface vein is be from 12 to 14 feet deep, while an understratum, separated by a l slate, is being sunk upon and is more than 6 feet deep and the not yet reached. This understratum is of a much better quality a a glistening jet color. Coal from the upper stratum is in gene *by blacksmiths*, and they pronounce it an excellent article. Its v *being* appreciated so much that it is superseding the use of ch

The Cle el-um coal bed is the richest strike yet made in the Territory, and the quality of the second stratum perhaps the very best that has been discovered on either side of the mountains.

The following additional information is furnished by Mr. Howard C. Walters, of Ellensburg:

"I forward in brief an account of the work of the year (1884) in mining, which it is safe to say will be largely increased during 1885 by reason of the completion of the Cascade branch of the Northern Pacific Railroad in this vicinity, which will render possible the easy shipment of machinery and insure the investigation by capitalists of the merits of our mineral belt. In this county are included the several mining districts formerly embodied in Yakima County. The mines are largely in the hands of prospectors of limited means, or of local business men, who, by reason of general depression occasioned by lack of shipping facilities for the agricultural products of the region, have been unable to expending any considerable amount of money in mineral development.

"In the *Pechastin district* about 119 tons of quartz were crushed, producing $22 per ton. The ore was worked in a small 6-stamp water-mill, which, owing to the inexperience of the owners, was so run down that it was obliged to stop.

"The mill, together with the Shafer, Bob-tail, and Humming Bird mines, has passed into the hands of Mr. Thomas Johnson, who is engaged in developing the mines and extracting ore, preparatory to operations during the coming summer. The product of the Shafer group of mines, as also of the Tip-Top, Pole Pick, Golden Phœnix, Black Jack, Western Star, Evening Star, and several other prospects in the immediate vicinity, shows that good, practical experience rather than capital is required to make the working of these mines a success. The mineral belt of this county is very extensive, and carries as rich top rock as has been discovered in any mineral belt of similar extent.

"The Cascade branch of the Northern Pacific Railroad is now penetrating Kittitass County, and capitalists and experienced miners who have been heretofore deterred from attempting to open up these properties, owing to 150 miles of wagon and stage haul, will during the coming year fully investigate the surface merits at least of the Kittitass County mines."

LEWIS COUNTY.

The following is furnished by Mr. G. W. L. Carmack, who has just returned from his quartz claim near Mount Ranier:

"I have been prospecting for another lode which I believed existed from the appearance of the wash gravel and general formation of the rock. I was well rewarded by discovering a ledge containing ruby silver, a scattering of gold, with some copper and lead.

"There are several specimens of quartz from the same ledge. I have a few specimens of the rock as white as snow, with black streaks running through it. Another kind is of a dark color and honeycombed completely through with veins running in different directions which are black, and occasionally a small thread of metal passes from one side of the cell to the other. The other samples are of a gray color and look like the granite of New England."

SKAGIT COUNTY.

The only mining done in this county is some placer mining on a tributary of Skagit River, in what is known as *Ruby Creek district.* About 5 men are employed and $5,000 in gold taken out. There are no quartz mines in this county.

STEVENS COUNTY.

Maj. C. E. Sears, United States mineral agent, who has recently surveyed the Similkameen mines, in the Moses Reservation, near the British line, says that he surveyed seven mines and had specimens with him that would assay from $500 to $10,000 per ton.

The veins of the mines surveyed run north and south, and most of them can be distinctly traced for a distance of nearly 5 miles. He says that the road through Harrington is the only short and practicable route to reach these silver mines, and an excellent Indian ferry across the Columbia can be found about 17 miles from Grand Coulee Post-Office. There have already been 300 claims located in the Similkameen district, and a short distance from there is a large colony of Chinamen engaged in placer mining.

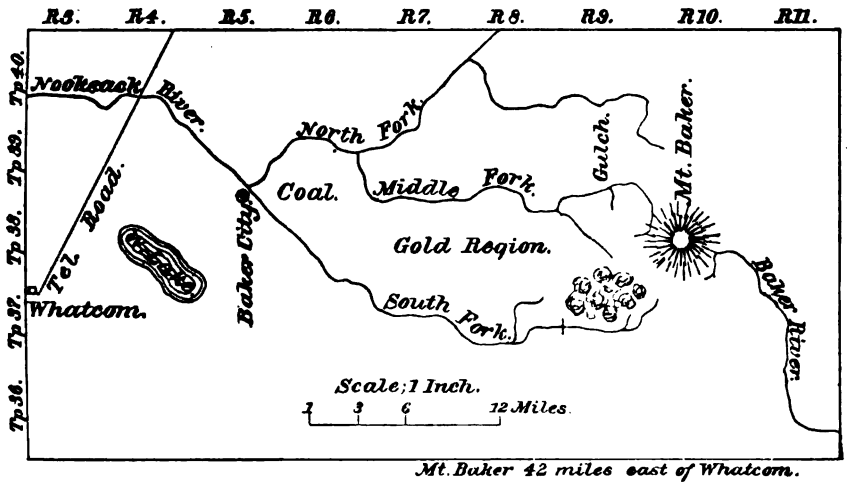
WALLA WALLA COUNTY.

From present indications the flour gold diggings in Snake River Valley, at Eagle Rock, will prove a profitable industry. The Andrews Brothers, practical miners, who went there early last season and introduced the gunny-sack system to catch the small particles of gold dust, cleaned up over $8,000 last summer, and they have again resumed operations, with flattering results. Other companies have been formed and a number of new claims will be opened this summer. No one thus far, except the Andrews Brothers, has succeeded in saving the gold, which is so light that it floats on water like a feather, but from the simplicity of the system others will probably soon succeed with it.

There are many signs of gold-quartz ledges near Mount Baker, which have been but little tested, owing to the isolated condition of the locality. This county is rich in its immense deposits of coal and iron, both of a very superior quality. Quarries of excellent lime and marble also exist.

Estimate of Mr. A. M. Lawver of the bullion product in Washington Territory for the calendar year 1884, *classified by counties.*

Counties.	Gold.	Silver.	Total.
Columbia	$40	.....	$40
Franklin	479	.....	479
Garfield	174	.....	174
Jefferson	9,590	.....	9,590
Kittitase	12,758	$25	12,783
Kitsap	600	.....	600
King	370	.....	370
Lincoln	883	.....	883
Lewis	120	1,154	1,274
Spokane	22,769	.....	22,769
Skagit	5,000	.....	5,000
Thurston	30	.....	30
Walla Walla	4,970	.....	4,970
Whitman	15,969	.....	15,969
Yakima	200	.....	200
Total	73,952	1,179	75,131



MAP OF MOUNT BAKER GOLD MINES AND ADJACENT COUNTRY.

H. Ex. 268

CHAPTER XIII.

MINES OF THE APPALACHIAN RANGE.

NORTH CAROLINA.

e was a considerable falling off in the production of the precious in North Carolina during the year 1884.
ıe central area of the State and the adjacent belt some mines uspended and others gave diminished returns, while but few in- l their output.
slight gains did counterbalance the losses, but the falling off was ırked here than elsewhere. In the eastern belt there was greater y in one part and less in others, so that the gains nearly equaled

placer work of the State suffered severely by the unprecedented .t of the latter half of 1884; besides, the smaller operators have ted nearly all the areas that can be successfully worked without appliances and more capital than they can command. This, with ater remuneration of the agricultural and mechanical pursuits, gely stopped work of this character. In addition to these causes, ›w enterprises which had not reached a self-sustaining point were ›d of financial support by the business reverses of the spring of

production of the State was distributed among the counties as fol-

	Production.
ı, Nash, and Warren	$4,000
	2,500
nery	3,000
h and Davidson	51,000
	2,000
	3,000
s	29,000
	2,500
	3,000
burgh	33,000
	2,500
ı	1,000
ll, Burke, and Rutherford	15,500
	2,000
e and Transmontane region	5,000
l	500
	159,500

hich amount about $3,500 was silver.

FRANKLIN, NASH, AND WARREN COUNTIES.

e was a slight increase of activity at the Portis and Arrington which resulted in a larger production, but w.. these exceptions

the work done did not vary materially from former years, nor was there any marked success in the different processes experimented with. The production of these counties is believed to have been about $4,000.

MOORE COUNTY.

There was a largely reduced production in this county during 1884.

At the Burns mine two runs were made in January with the Parsons amalgamator, but in the spring operations were entirely abandoned and the mine has since remained idle.

A small amount of work was done at the Clegg, but without adding materially to the production of the county.

The Cagle mine was not in condition for regular work until summer, and the product during the latter part of the year was not large.

The Bell mine received a new outfit of 4 stamps. The main shaft was sunk to a depth of 110 feet, the last 10 being on the slope of the vein. Only a few runs had been made when the mine was stopped by litigation. It will probably remain idle for some time.

These were about the only mining properties in which work of any importance was done during the year. The bullion product of the county did not exceed $2,500.

ANSON COUNTY.

The Mikado (Hamilton) mine was developed to some extent, but no milling was done and the amount produced was insignificant. At the close of the year the mine was filled with water. This was the only mining property in this county on which I could learn any work had been done.

MONTGOMERY COUNTY.

Mining work in this county was dull during the year. The Beaver Dam and Sam Christian mines were entirely stopped, except some surface work by small operators, and the Henderson, Saunders, and Steele were also idle.

At Bennett Mountain no mining of importance was accomplished.

About Eldorado, in the northern part of the county, some placer work was attempted at long intervals by the farmers, but placer work in this county has been considerably decreased.

The Coggins mine was operated successfully by Mr. Loften during the early part of the year, when it passed into the hands of Ohio parties, who spent the remaining portion of the year in developing it.

On the Morris Mountain mine only some prospecting was done. The Little Lead gold mine, sometimes known as the Russell, was also prospected. Work was begun on it June 15, in the main shaft, and a tunnel was commenced in the side of the hill. After running 150 feet the vein was reached and the tunnel run upon the vein 50 feet more, and is now 25 feet from bottom of main shaft, which is 70 feet deep. A small plant was put up in the mill-house, consisting of a 25-horse power engine and boiler, a Moore ware-plate amalgamator, and two Chilian mills. Four weeks' actual run was made.

The product of the county was approximately $3,000.

STANLY COUNTY.

The Crowell mine was filled with water the entire year, but it was rumored in December that it would shortly be put to work.

The Parker alone was operated with steadiness, and the returns from

it were not large. Some surface work was done about the Lawder, Hearne, Heathcock, on Rock-hole Creek, and in other localities, but the result was small. The production of the county did not exceed $2,500.

UNION COUNTY.

Bonnie Doon (Crump) mine was the only one worked systematically, and at it the work was mostly prospecting. During the year machinery for treating the ores was located.

The other mines operated were the Davis, Phifer, Harkness, Hemby, and Howie, and they in a very desultory manner.

Some little surface work was done in places, but as a whole the work fell off considerably from the prior year and the product only amounted to about $3,000.

GUILFORD COUNTY.

The mines in which any considerable activity was shown were the North State and the Fisher Hill. At the former the work was chiefly prospecting, but some mill-runs were made on refuse ores lying on the surface. At the latter mine, as reported by the superintendent, a few trial tests were made of surface dirt by the stamp-mill. A substantial mill, 30 by 60, and other structures were erected. A 50 horse-power boiler and 40 horse-power engine were put in, and a stamp-mill with 5 stamps and frame work for 10. The shaft was put down to 106 feet through the granite and a tunnel run to meet the vein, which at the end of the year was thought to be 40 feet distant. Fourteen distinct veins exist on the porphyry.

The petty work was so small as not to deserve mention, the entire production of the county not amounting to more than $2,000, which, though small, was in excess of the prior year.

DAVIDSON COUNTY.

The Conrad Hill mine was the only producer in this county during the year. The character of the work was the same as that described on page 648 of the report for 1883. The steps in the work may be briefly enumerated as follows: Mill treatment of the ore for extracting the gold by amalgamation; concentrating the tailings, which concentrates, with the cobbed sulphurets (largely sulphurets of copper), are sent to the Hunt and Douglas reduction works for extracting the copper; thence the residues are returned to the mill for amalgamation again.

There was no marked change in any of the appliances or processes, though some difficulties in extracting the copper were overcome, and hence the residues were left in better shape for the full extraction of the gold. The deepest shaft was down nearly 400 feet. The mill was run five months, and with a return about equal to that of 1883; but the general financial embarrassments of the county and the depression in the price of copper made it expedient to curtail operations.

No work was attempted at the adjacent Silver Valley mine except to test the Rittenger concentrating tables. The result must have proven unsatisfactory, as work was suspended and the mine allowed to fill with water. A small amount of concentrates was shipped to reduction works for experiment.

The Cid mine was worked at intervals. This is a copper mine carrying gold and silver, and no direct production of the precious metals is to be expected from it.

RANDOLPH COUNTY.

The Herring mine was worked in a small way at intervals, and with small returns. At the Jones mine, near Ashborough, 10 stamps were put in which were removed from the old Lalor mine, near Thomasville, but only one or two runs were made.

Placer work in this county has almost ceased.

The Hoover Hill mine was operated even more extensively than in 1883, and with better results. The mill at the close of the year had run thirteen months without intermission except for slight repairs. A better class of ore was obtained, which appreciably increased its bullion output. Development was continued in the bottom beneath the Gallimore and Briols shafts, the former a vertical and the latter an inclined shaft, below the 100-foot level, and coming into the Gallimore at 230 feet. The Briols chute, from which the greater portion of the ore reduced during the year came, was at the 230-foot level fully 70 feet long (and the south end not yet reached) and from 10 to 12 feet thick. The Hawkins shaft reached a depth of 135 feet, and was opened by two stopes at the 125-foot level and by six stopes at the 80-foot level, *i. e.*, there were six parallel bodies of ore. Of these stopes, Nos. 1 and 2, respectively 10 and 12 feet wide, gave fair ore, and the other stopes, which were narrow, a low-grade material. The ore taken during the last year from the Hawkins shaft was mainly from Nos. 1 and 2. Mr. Hanna says that, from a personal inspection of the stopes, he estimates fully six months' reserves in sight and the mine in condition to develop these other bodies. This mine was the largest producer in North Carolina in 1884.

The entire production of these two closely related counties, Davidson and Randolph, was $51,000.

ROWAN COUNTY.

No continuous, well-directed mining was done in this county during the year; the work which was done being of a desultory character, the production fell off.

The Dunn Mountain mine did some little work in the early part of the year, but with paltry returns.

The New Discovery, the Yadkin, the Gold Knob, and the Dutch Creek mines remained closed the entire year.

The Rowan Mining and Milling Company stopped work early in the season. At the Reimer a new and deeper shaft was planned and partly sunk. The Gold Hill mine was unproductive, and work was restricted to keeping it free from water. Tributers raised a small amount of ore from points near the surface, but for some unknown reason the large bodies of ore in the mine remained untouched. The famous "Texas chute," though well exposed at the bottom of the Randolph shaft, at the depth of 750 feet, was not prospected further. The product of the county was about $3,000.

CABARRUS COUNTY.

The Rocky River mine was operated for a brief period, and a few mill-runs were made which were reported successful; nevertheless work was discontinued. The Quaker City, the Neal, and the Tucker were closed, and the Plattner chlorination works, in connection with the last-named mine, were run only two or three times for experimental purposes, the death of the superintendent having seriously disarranged the business.

hœnix continued its operations with great regularity. A depth
eet was attained, and preparations were made to sink one lift
deeper. Stoping was confined to the 250-foot level and points
An inspection of the dump showed ore of about thesame char-
that described in previous reports.
hlorination works were run without material change, except
methods of chlorination were simplified. The superintendent
the same closeness in the percentage extracted. The supply
r is inadequate, and the plant is too small to treat all the ore
he mine can yield. As there is a large reserve of ore at com-
; is probable that the establishment will continue work for some

Reed continued some small work on his mining property near
l, with satisfactory results. The estimated production of this
is $27,000.

MECKLENBURGH COUNTY.

on the Arlington Guarantee stopped early in the year, on ac-
legal troubles. The Ray, of the Baltimore and North Carolina
ıd Copper Mining Company, was closed in March. A small
of work was done at the Johnson and Black, and also at the
and Mans.
lark was reopened near the close of the year. The underground
ached a depth of 86 feet and the veins were uncovered. The
is being emptied of water. A fine body of ore was uncovered
owell, south of the Rudisil, which promises well. The principal
work was done at the Capps, Rudisil, and Saint Catharine. At
ner the work consisted mainly in working at the 10 stamp mill
during the summer the large amount of ore which has accumu-
the dump, and but little was done underground.
e Rudisil the large body of ore south of the main shaft was still
exploited, and a new level run at the depth of 350 feet, to cut
e body of ore 50 feet deeper.
himney at this depth was not so favorable as at the higher
hough the vein was prominent and well defined. The ores were
to reduction works.
nine has recently been leased for the period of eighteen months
ston party, and it is the intention to explore the north part of the
Burk Hill. It is expected that the machinery for a new method
gamation will be erected, and that the plant will soon be in ope-
Work at the Saint Catharine was actively prosecuted during
r, and the depth of 300 feet was reached. Sufficient develop-
s not been made at this depth to determine the extent of the
r, but the indications point to the existence of the chutes undi-
d in character and extent. The ore being sulphurets, no direct
ion is made. The ores, after cobbing, are stamped and con-
d on Frue vanners, and the clean sulphurets shipped north.
ner work of this county was small. The entire production, in-
the contents of ores shipped, was about $33,000, which was
in excess of the production of the prior year.

GASTON COUNTY.

gular mining was attempted in this county during the year,
ne slight work being done at the Burrell Wells and the King
in mines, and the production did not exceed $2,500.

CATAWBA COUNTY.

The only mine which was systematically worked was the Shuford. The superintendent, Mr. F. W. Dygert, reports that the work for 1884 has been mostly of the prospecting order, testing the stringers and gash veins at water-level, and this only up to June, at which time the drift was flooded, causing a suspension of work. No milling was done except to test the ore taken out, which was a small amount. Some little placer work was done, but of no particular merit.

BURKE, M'DOWELL, AND RUTHERFORD COUNTIES.

The Mills property, at Brindletown, was vigorously operated during the year, but as the gravel was deeply covered with earth, the work was mainly directed to removing the dirt and tunneling it, preparatory to extracting the gold. The veins of this property have been prospected with a view to deep mining, and plans for a stamp-mill have been made. Eight or ten veins are found in the spurs of Silver Knob and within a distance of 200 feet, all of which are of sufficient width to justify working. Gulches cut these veins in some places and allow of easy entry by adits. In addition to ease and simplicity in mining this method allows of the transportation of the ore by gravity tramways directly to the mill. This section is prolific in vein-material of fair grade, but in order to make it remunerative it will be necessary to use vein-mining in connection with hydraulic work. There are several localities well adapted to the Georgia method of mining, which must ultimately be adopted here, Vein Mountain and the Mills property being conspicuous examples. The entire yield of these counties was approximately $17,000.

POLK COUNTY.

No regular work was carried on except at the Double Branch mine, where the operations continued without change. Placer work was slightly increased, amounting to about $2,000. The region west of the mountains has its business connections quite as much with Georgia as with North Carolina.

The amount produced by this county did not exceed $5,000.

PERSON AND GRANVILLE COUNTIES.

There are several localities in these counties which yield a high grade of argentiferous copper sulphurets, carrying some gold, notably the Yancey, the Gillis, and the Copper World, in Person County, which, with the Big American, in Granville, form a group within a short distance of each other; but little work has been done at them. Of the Big American the manager says: "A few weeks' work was done in 1884, and a depth of 40 feet was reached and a level run. The vein was from 3 to 4 feet wide, with a handsome proportion of rich sulphurets. Twenty tons were accumulated on the dump." The ore of this mine was of the character of boronite.

SOUTH CAROLINA.

The placer work in this State was somewhat less than in the prior year, but the larger mines slightly increased their product, bringing the production of the State up to about $57,500, of which $500 was silver, *about* the same as in 1883.

At the Brewer mine, in Chesterfield County, some slight changes were nade in the locality of the developments and in methods, with a view :o economy.

At the Funderburke mine, in Lancaster County, the work was chiefly prospecting. Several veins were uncovered and the ore tested. A 5-stamp mill was erected and operated for a short time. The ore, however, changed to sulphurets, which was too refractory to amalgamate, and milling was stopped. Of the Haile mine, in the same county, the superintendent, Mr. E. G. Spilsburg, says:

"The work done during the year has been in opening up additional ground on the 25-foot level, sinking 75 feet on the Blanvelt vein, and stripping and taking out at No. 3 opening from the surface to the 75-foot level; also in driving drifts to undercut the old Haile pits. The developments during the year have more than borne out the expectations of the owners, and practically placed the continuity of the ore supply beyond all doubt. The company have extracted over 15,000 tons of ore ahead of their present milling capacity, and are erecting a new mill with the capacity of 240 tons a day."

It may be added that work was kept up during the year at the mill and chemical plant without interruption except for necessary repairs, and the returns were very steady, fully sustaining the reputation of the mine. The production of this mining district was about $44,500.

The only mines in York County upon which work was done during the year were the Black and Wilson, that on the former being insignificant in amount. The latter was opened early in the year, but no milling was done until September. Dr. J. W. Huckabee says of it:

"Our old shaft, which was down to a depth of 65 feet, was reopened and sunk 25 feet additional. A 10-stamp mill was erected and milling commenced in September, but in consequence of the engine breaking work was suspended in November. It will be resumed, however, as soon as the repairs can be made."

A drift was run in both directions from the bottom of the shaft, that to the northwest being all the way in ore. A personal examination of the vein showed the mineralized part to be from 2 to 3 feet wide, partly in brown ore and partly in iron pyrites, containing a trace of copper. The two portions are in separate laminæ and are readily sorted by hand. The ore is of fair grade, but at least one-half of it is unsuited for amalgamation.

SPARTANBURG COUNTY.

The Hammett mine is 7 miles from Cowpens, on the Air Line Railroad, and one-half mile from Pacolet River. Prospecting had been done at this mine for two years prior to 1884, but in the spring of that year a hydraulic apparatus, the forcing pump being of the Worthington make, was introduced for lifting the water from the Pacolet River to the mine, a vertical height of 192 feet. The mine is a surface one, consisting of shallow-lying gravel with a few narrow veins. The mine requires hydraulic treatment. The apparatus to lift the water was unfortunately so arranged that, instead of securing a powerful stream which would tear up the gravel and expose it for treatment, it simply flooded the work. The work, therefore, consists of sluicing, and is carried on in a small way.

UNION COUNTY.

Thomson mine, just east of the Spartanburg line, was operated only at intervals, and the returns were not large.

The West, near by, was at work the entire year. Mr. R. A. How-

kins says of it: "During the year ore has continued to be taken out from the 50-foot level, going northeast, and another level run southwest 75 feet down and in fair ore. A shaft has been sunk on Posey Hill to a depth of 78 feet, and levels run. A large quantity of ore has been taken out at this point, which has averaged well. Some small strata yielded from $200 to $500. The ore was soft to a depth of 60 feet and of the 'coffee-ground' order. A shaft has been sunk on the hill to the north of the mill to a depth of 60 feet, the ore being hard on the surface but easily broken. Strata of brown ore and white 'sugar quartz' are found from 1 to 2½ feet wide, which yield from $50 to $1,000. All the ore carries sulphurets of iron, which when concentrated yield sulphurets to the value of $1,000 per ton. As yet no works have been provided for treating them." The value of the product of York, Union, and Spartanburg Counties was approximately $10,500.

GEORGIA.

There was a marked decrease in the production of 1884 from the prior year, a reduction owing in part to the summer's drought and in part to mining difficulties. The entire product was less than $137,000, of which not more than $750 was silver.

The yield by counties was approximately as follows:

Rabun and Habersham	$2,000
Oglethorpe, Elbert, Wilkes, and Lincoln	3,000
Columbia	4,000
Counties from Columbia to Merriwether	5,000
White	8,500
Lumpkin	89,500
Dawson	2,500
Forsyth, Cherokee, Cobb, Paulding, Haralson, and Carroll	12,500
Towers, Union, Fannin, Pickens, and Gilmer	10,000
Total	137,000

In Rabun County mining has almost ceased, even petty work which has heretofore been actively carried on.

The Smith was the only mine regularly operated, and it, owing to a variety of causes, produced but $1,500.

At the Habersham mine the work was also of a restricted character, the production not exceeding $500. At the Magruder mine, in Lincoln County, the work was mostly prospecting, the product being from ore obtained in opening the mine. The ore is principally lead and copper.

In Columbia County considerable activity was shown in a small way, no regular mining being done, and this county added nearly $4,000 to the bullion product of the State. Mining in the belt passing through these counties, and continuing southwest through the State to Alabama, was formerly actively prosecuted and was very remunerative; at present, however, I do not know of any mining being done in it, with the single exception of the Wilkes mine, which was merely prospected.

WHITE COUNTY.

The production of the mines of this county fell off one-half from the prior year. In the Nacoochee Valley the Santac was worked regularly during most of the year and considerable gold was obtained by sluicing. In December, 1884, two very fine ore-channels had been opened, in both of which auriferous deposits of fair grade appeared. It was the inten-

tion at that time to put up a 20-stamp mill. The syndicate engaged in arranging the mining territory about Nacoochee with reference to sales n England had not succeeded in November in accomplishing their purpose. Mining has almost entirely stopped in the territory embraced in their plans. The superintendent of the Loud Hydraulic Hose Gold Mining Company says of it: "Very little work was done, on account of the uncertainty attending the results of certain suits for water rights. The main drain was not completed and work was stopped until all difficulties are settled."

LUMPKIN COUNTY.

Notwithstanding a reduced output of its mines, this county is still the largest bullion producer of the State. Very complete reports have been received in regard to the production of its mines, which amounted to $89,500, all being gold.

At the Garnet but little was done until May, from which month until October work was constantly kept up. From the latter date until December work was suspended, owing to the low supply of water, but was then resumed.

During the whole of this period development was continued, opening up reserve ground ahead of immediate needs. The work at this mine is of the same character as that usually in the mines of this part of the State. In the milling some novelties were introduced pertaining to the more efficient handling of the material. The ore from the cuts is run into sluices, passed over a half-inch grizzly, and on to a one-sixteenth-inch screen. In this way the coarse stuff is run into the the mill nearly free from the sluices, and to that extent partly concentrated. The sluices are run on ten burlap blankets, each 20 by 3 feet, which are periodically gently flushed and washed. The slimes are subsequently amalgamated in pans. The method has been in use but a short time, the results being encouraging. But little work was done at the Calhoun and none at the Findley.

The pump-house of the Columbia was burned and the mill subsequently moved nearer to the ore-body. These changes prevented much work.

The gravel of the Keystone was worked slightly, the scarcity of water not allowing more extensive operations. A cave in the Fish Trap near the close of 1883 filled the ditches, and necessitated driving a large tunnel to reach and open up the ore-body again. The tunnel was finished late in April, but owing to a change in superintendents no important work was done until November, when full work was resumed.

The Bast was worked at nearly full time until the middle of August, when work was suspended for two months. The ore produced was of a better grade than usual. This mine, with the Ivey, 2 miles distant, forms a part of the Consolidated Gold Mining Company of Georgia, but the two mines are independent in their operations.

At the Ivey only about a third of the milling capacity was used. The development work was large, but the production small. During the last three months the extensive drought necessitated closing. The special ditch to supply water, completed in the prior year, was found deficient, and a considerable portion of the spring was spent in remedying the defects. The Singleton Gold Mining Company's property, embracing the Singleton and Stockhart, was sold in April. Pending the sale little work was done, and it was not until October that regular work was resumed.

The Pigeon Roost was worked irregularly during the year, and in

December was advertised for sale. The Barlow was worked with regularity, but on account of the dry weather and consequent low water only 30 stamps were on an average run during the summer and fall. The mine has 40 stamps, run by water-power. The superintendent has about completed a connection with the large water supply of the Hand ditch. The ditch is tapped at a height of 160 feet above the turbine, and with that high pressure a very moderate supply of water will suffice. So careful and economical are all the arrangements that the cost of mining and milling does not exceed 25 cents per ton. The work has been nearly uniform for several years, and the mine is apparently in excellent condition.

The Ralston, one-fourth of a mile southwest from the Barlow, is on the same belt and is similarly operated.

The Enterprise was started in 1883 and actively worked during the last year. It is well equipped in every respect, having 20 stamps, and is likely to do good work. The cost of mining and milling has been reduced to 22 cents a ton.

The Gordon, one-half a mill southwest of the Ralston, is also on the Pigeon Roost belt, but in addition has as collateral resources the Ogle, the Thomas, and the Gold Hill belts, all of which can be easily worked. A main ditch has been run to cross-cut the belts at right angles, and a 20-stamp mill nearly completed.

The Chicago and Georgia, near the village of Auraria, was worked vigorously for about seven months, the character of the ore produced remaining the same as previously described.

The Auraria Gold Mine was run only about three months.

The Danae, adjacent, was also idle during most of the year, some placer work being effected and a small amount of ore extracted and milled.

The Bell and Chestatee mines were not worked during the year. The petty production, mostly obtained from placers, amounted to $5,000. Twenty additional stamps were erected in this county during the year, making the milling capacity 460 stamps. Considerable attention was given to improvements in economic methods and managements, and but little to more effective treatment of the ore with reference to a complete extraction of the gold.

DAWSON COUNTY.

The mining work of Dawson County was confined almost entirely to the Kimori. The Hendy hydraulic lift was successful in its work and fully came up to expectations, but the vein bottom to which it was applied was found much poorer than anticipated. A 30-stamp mill is being erected, the main portion of it having been removed from the Magic, near by. The mill will be run by a No. 10 Leffel turbine, with 205 feet head of water. The petty operators did less than usual. The entire product of the county did not exceed $2,500.

In Forsyth County some little placer work, amounting to about $1,000, was done near Sawnee Mountain.

In Cherokee County the Franklin and McDonald was the only mine operated. The superintendent says of it: "The nature of the work consisted of improvements in drainage, changing from steam-pump to Cornish run by water power brought 2 miles, sinking shafts, opening new levels, putting in new 50-horse power boiler for hoisting, and getting ready generally for new mill to be erected in 1885. No milling was done until near the close of the year, and then only 5 stamps of the old *mill* were in condition to run, and they not in good condition. The five *stamps* when running earn from $90 to $125 per day of twenty-four hours.

he ore worked was a sulphuret of iron and a raw sulphide of iron. Dr. harles's prepared quicksilver, and plates were used." The same gentle- ıan says that no other mining was done in the neighborhood, except ›me branch mining by John Snowden, 1 mile below.

In Carroll County a considerable number of people are at intervals ıgaged in old placer work near Villa Rica, with some success. The rnestine Company were sinking a shaft near Villa Rica, but have not ‹ached the ore-body. A 10-stamp mill has been erected by the Excelsior ompany of Chicago. Some prospecting has been done in Pine Mount- in, 3 miles northeast of Villa Rica, and it was contemplated to erect stamp-mill.

Of the Clopton mine, Moses N. Wheeler, superintendent, says: "This ıine has only been tested by milling for about two weeks, a small quan- ty having been taken from the different fissures or veins. No effort ·as made for general working. It is the purpose to work the ores with n 8-stamp quartz-mill, and probably 20 more stamps will be added. ‹eservoirs have been constructed and ditches cut. In running a cross- ıt from 30 to 40 feet deep some hun dred feet of vein-matter was cut ırough."

The production of this range of counties from Forsyth to Carroll was pproximately $12,500. In the counties of Towers, Union, and others o large mine was worked during the year. A mill was erected near ıe old Gum Log mine, in Towers, and there was considerable activity mong small mines. The production of these counties was about 10,000.

Some discoveries of silver have been reported in Murray and Gilmer ounties, but as it requires smelting it would necessitate transporta- on of the argentiferous mineral outside of the State, and consequently have not included them in the bullion product.

ALABAMA.

Only two mines were worked in this State, the Cooper Creek mine, in allapoosa County, and the Shankle, in Clay County. The former is 12 iles south of Dadeville. The property consists of 560 acres, and 3 lacers are worked, the first at Silver Hill, where the bulk of the present ork is performed, the second at Dent Hill, and the third at Blue Hill, bout 3 miles west of Silver Hill. Work at Silver Hill is after the ap- roved Georgia method, and the ore formations resemble those of Lum- kin County. A 10-stamp mill of the Hale pattern was erected and put ›work in October. A 40 horse-power Worthington pump lifts the water › the summit of the ridge, 105 feet, to a reservoir of 300,000 gallons ıpacity, when the water is distributed as needed through pipes and ıices. The cuts were well opened, the machinery in good condition ıd fully adequate, and the ore-bodies of sufficient extent to supply the ill.

The operations of the Shankle mine, in Clay County, are described by ıe manager as follows: "The property has been prospected for three ears and a small amount of gold produced by a rocker. In October tunnel was driven in 54 feet and 200 tons of ore taken out. We are ›w erecting a 5 stamp mill which will be completed by January 1, 1885. s soon as the mill is satisfactorily tested 5 more stamps will be added." bout Arbacoochee and Pinetuckee districts petty mining is still car- ed on.

The entire production of the State is not more than $8,000, of which ll but about $50 was gold.

CHAPTER XIV.

MISCELLANEOUS.

VERMONT.

The following article in regard to the gold discoveries in the State of Vermont was furnished by Mr. Anthony Blum, president of the Rooks Mining Company:

"DISCOVERY OF GOLD IN VERMONT.

"The first certain knowledge of the existence of native gold in Vermont was in 1851, when Mathew Kennedy, at or near the north end of the now so-called Plymouth gold mines, found what he supposed to be a very fine specimen of iron pyrites, imbedded in quartz rock. After having these specimens tested it was found the supposed pyrites were nuggets of pure gold, and more than $5 worth of gold was taken out of about 1 cubic foot of quartz rock. A search was made in the vicinity of the discovery, without much success.

"In 1855 William Hunkerson, an experienced California gold-miner, came to Tyson Furnace, Plymouth, Windsor County, Vermont, on a visit, and being impressed with the likeness of the region to the gold-bearing formation of California, and believing that placer gold could certainly be found here, began to prospect on Reading Pond Brook, in the south part of the town of Plymouth, where he obtained the first gold found in the streams or alluvial deposits of Vermont.

"In 1856 placer mining was begun on Reading Pond Brook and on Buffalo Brook, its largest northern branch, and also on Gold Brook, at Plymouth Five Corners, and during that year and the next four years a large amount of gold was taken out and some large nuggets were found. Lawyer and Eddy took out below the junction of Reading Pond and Buffalo Brooks a nugget worth $14. A Mr. Williams, on the next claim below, took out one worth $31, and quite a number of other nuggets were found for 1 mile or more below the junction of the brooks, worth from $1 to $5 each.

"William Hunkerson worked a very rich claim at Plymouth Five Corners and took out several very valuable nuggets, one of which was worth $9.30. After the death of Mr. Hunkerson, Joseph W. Wilder and Augustus Trudo, managers for a Boston company, took out quite a large amount of gold from these diggings. There were many claims dug over on Reading Pond Brook, Buffalo Brook, and Gold Brook, farther north. Among those most successful in finding gold in paying quantities were Beals & Graves, Lawyer & Eddy, the Wells Brothers, William Hunkerson, Dunham & Brown, A. S. Day, Wilder & Trudo, and Virgel Woodcock, and the product of these placer workings amounted to over $20,000 in gold taken out prior to the year 1879. Something was done

out this time in testing the quartz veins which were found in the uthern part of Plymouth, and assays from surface croppings that were de ranged from $2.50 to $57 per ton.

'In the spring of 1880 Charles C. Rooks, of Stonewall, Ind. T.; seph R. Harris, of Saint Louis, Mo.; Joseph C. Blum, of Towanda, ., under the management of Anthony Blum, of Colorado, com- nced a thorough system of gold placer mining, with 13 men, shov- ng in sluices on Reading Pond Brook, and while thus removing allu- l deposits a promising vein of gold-bearing ore was uncovered. The ıcer diggings, producing to a limited extent, were stopped, and work shed by night and by day on the vein discovery. A mill, boarding- use, dwellings, barn, and other buildings were erected, the mine and ll were furnished with machinery, and on the second day of October, 82, the Rooks Mining Company was organized under the laws of New rk, with Anthony Blum manager, and purchased this new discovery, e entire plant, and about 400 acres mineral land hitherto worked by ıcer mining. The new company carried out the plan of their prede- ısors, and started the mines and mills into practical operation on the th day of September, 1883.

'The vein is visible by its surface croppings a distance of about 1 mile. velopment on the vein consists of a shaft, 235 feet deep, 6 by 8; drift,) feet long, 6 by 7; cross-cut, 70 feet long, 5 by 7; tunnel, 116 feet long, y 7; a tunnel tapping bottom of shaft, 350 feet long, 6 by 7, the work- ; entrance of the mine. The vein has an average width of 6 feet, in- ed between permanent continuous walls. The vein-matter is an aurif- us crystalline matrix, pregnated with sulphurets of iron, while oc- ionally free gold is found in cavities that have become oxidized, and the oxide of which our vein-matter is tarnished and interstratified; the gold generally is coated with a foreign matter, which we remove h chemicals in process of milling the same, in order that mercury may e up the gold. All the vein between walls is worked, and yields an rage of $46.29 gold per ton. The product of the mine and mill from tember 17 to December 31, 1883, was $5,026.59; for calendar year 4 was $62,485.30; total, $67,511.89; running only by day up to May 1884, afterwards by day and by night, in 10-hour shifts for one day's rk.

'The foregoing is from a plant of 6 tons capacity per day. The com- y are making arrangements to erect a mill of a daily capacity of 100 s, when it is thought the yield can be largely increased."

As the mining company of which Mr. Blum writes produced during past year over $60,000 worth of gold, a description of it is thought thy of a place in this report.

PART II.

GENERAL STATISTICS.

GENERAL STATISTICS.

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GENERAL STATISTICS.

I. ANNUAL STATEMENT OF MR. VALENTINE.

Fargo & Co., express and banking. Office of the vice-president and general manager.]

SAN FRANCISCO, *January* 1, 1885.

R SIR: The following is a copy of our annual statement of pre- ietals produced in the States and Territories west of the Missouri (including British Columbia, and receipts by express from the ɔast States of Mexico) during 1884, which shows aggregate prod- ts follows: Gold, $26,256,542; silver, $45,799,069; copper, ,252; lead, $6,834,091. Total gross result, $84,975,954.

fornia shows a decrease in gold of $944,703, and an increase of of $513,597. In Nevada, the Comstock shows an increase of ,524; Eureka district shows a decrease of $123,152. In the total :t of the State there is an increase of $117,318; Montana shows iderable increase; Colorado and Arizona, a decrease from the :tion of 1883.

ıtated hitherto, the facilities afforded for the transportation of , ores, and base metals, by the extension of railroads into mining ts, increase the difficulty of verifying the reports of the products ɜveral important localities; and the general tendency is to exag- ɔn when the actual values are not obtainable from authentic ɜ; but the aggregate result, as shown herein, we think may be ɔn with reasonable confidence as approximately correct.

s and Territories.	Gold dust and bullion by express.	Gold dust and bullion by other conveyances.	Silver bullion by express.	Ores and base bullion by express.	Total.
.....	$12,282,471	$614,123	$1,504,705	$871,689	$15,272,988
.....	1,527,859	.....	5,905,304	1,455,776	8,888,939
.....	368,315	184,157	2,695	.....	555,167
ɔn.....	45,964	22,982	1,179	.....	70,125
.....	35,014	80,000	.....	.....	115,014
.....	1,010,077	150,000	812,100	1,570,000	3,542,177
.....	1,875,000	.....	6,175,000	3,812,000	11,862,000
.. ..	31,501	4,184	2,657,054	4,697,147	7,389,886
.....	2,575,861	.....	4,877,888	12,780,000	20,233,749
ico	157,688	60,000	906,248	2,536,678	3,660,614
.....	360,791	100,000	3,139,628	3,455,960	7,056,379
.....	2,726,847	150,000	110,000	.....	2,986,847
ɜrest coast States)....	285,256	.....	2,257,144	12,000	2,554,400
ɔlumbia.....	647,719	140,000	.....	.....	787,719
al.....	23,930,363	1,505,396	28,348,945	31,191,250	84,975,954

The gross yield for 1884, shown above, segregated, is approximately as follows:

Metals.	Per cent.	Amount.
Gold	30.90	$26,256,542
Silver	53.90	45,799,069
Copper	7.16	6,086,252
Lead	8.04	6,834,091
Total		84,975,954

Annual products of lead, copper, silver, and gold in the States and Territories west of the Missouri River, 1870–1884.

Year.	Production as per W. F. & Co.'s statements, including amounts from British Columbia and west coast of Mexico.	Product after deducting amounts from British Columbia and west coast of Mexico.	The net product of the States and Territories west of the Missouri River, exclusive of British Columbia and west coast of Mexico, divided, is as follows:			
			Lead.	Copper.	Silver.	Gold.
1870	$54,000,000	$52,150,000	$1,080,000	.....	$17,320,000	$33,750,000
1871	58,284,000	55,784,000	2,100,000	.....	19,286,000	34,398,000
1872	62,236,959	60,351,824	2,250,000	.....	19,924,429	38,177,395
1873	72,258,693	70,139,860	3,450,000	.....	27,483,302	39,206,558
1874	74,401,045	71,965,610	3,880,000	.....	29,699,122	38,466,488
1875	80,889,057	76,703,433	5,100,000	.....	31,635,289	39,968,194
1876	90,875,173	87,219,859	5,040,000	.....	39,292,924	42,886,935
1877	98,421,754	95,811,582	5,085,250	.....	45,846,109	44,880,223
1878	81,154,622	78,276,167	3,452,000	.....	37,248,137	37,576,030
1879	75,349,501	72,688,888	4,185,769	.....	37,032,857	31,470,262
1880	80,167,936	77,232,512	5,742,390	$898,000	38,033,055	32,559,067
1881	84,504,417	81,198,474	6,361,902	1,195,000	42,967,613	30,653,959
1882	92,411,835	89,207,549	8,008,155	4,055,037	48,133,039	29,011,318
1883	90,313,612	84,639,212	8,163,550	5,683,921	42,975,101	27,816,640
1884	84,975,954	81,633,835	6,834,091	6,086,252	43,529,925	25,183,567

The exports of silver during the past year to Japan, China, the Straits, &c., have been as follows: From London, $40,221.658; from Marseilles, $1,361,250; from Venice, $130,680; from San Francisco, $13,903,990. Total, $55,617,578.

Product of gold and silver in the Republic of Mexico from 1877 *to* 1884.

[The production of 1883 to 1884 is estimated.]

Year.	Gold.	Silver.	Total.
1877–1878	$661,385	$21,451,785	$22,113,170
1878–1879	662,524	21,405,330	22,067,854
1879–1880	474,632	23,383,448	23,858,080
1880–1881	380,301	23 583,135	23,963,436
1881–1882	382,752	24,009,525	24,392,277
1882–1883	380,419	22,921,921	23,302,340
1883–1884	500,000	24,000,000	24,500,000
Total	3,442,013	160,755,144	164,197,157

Exhibit of coinage of gold, silver, and copper in the Republic of Mexico from July 1, 1872, to June 30, 1884, indicating approximately the precious metal product of the country for the years named.

[The production of 1883 to 1884 is estimated.]

Year.	Gold dollars.	Silver dollars.	Copper dollars.
1872-1873	813,415	19,680,811	22,814
1873-1874	866,743	18,846,067	15,966
1874-1875	862,619	19,386,958	21,712
1875-1876	809,401	19,454,054	30,654
1876-1877	695,750	21,415,128	9,035
1877-1878	691,998	22,084,203	41,364
1878-1879	658,206	22,162,987	16,300
1879-1880	521,826	24,018,528	14,035
1880-1881	492,068	24,617,395	42,258
1881-1882	452,590	25,146,260	11,972
1882-1883	407,600	24,083,921	.....
1883-1884	500,000	24,000,000	.....
Total	7,772,216	264,896,312	226,110

Grand total, $272,394,638.

Exhibit of the coinage of Mexico from the establishment of the mints in 1537 to the end of the fiscal year 1883-'84.

Periods.	Gold.	Silver.	Copper.	Total.
COLONIAL EPOCH.				
Unmilled coin from 1537 to 1731	$8,497,950	$752,067,456	$200,000	$760,765,406
Pilar coin, 1732 to 1771	19,889,014	441,629,211	.....	461,518,225
Bust coin, 1772 to 1821	40,391,447	888,563,989	342,893	929,298,329
	68,778,411	2,082,260,656	542,893	2,151,581,960
INDEPENDENCE.				
Iturbide's imperial bust, from 1822-'23	557,392	18,575,569	.....	19,132,961
Republic eagle, 1824 to June 30, 1873	45,040,628	740,246,484	5,235,177	790,522,290
	45,598,020	758,822,054	5,235,177	809,655,251
REPUBLIC.				
Eagle coin, from July 1, 1873, to June 30, 1884	7,772,21 6	264,896,312	226,110	272,894,638

SUMMARY.—Colonial epoch (from 1537 to 1821), $2,151,581,960; Independence (from 1822 to 1873), 809,655,251; Republic (from 1873 to 1884), $272,894,638; grand total, $3,234,131,849.

The exhibits of production and mintage indicate a steady development of the mining interests of Mexico, and with the increasing facilities of railway communication fostering every department of industry, the outlook for the prosperity of the Republic during the present year is most encouraging.

The exports of precious metals for the first nine months of 1884 show a marked increase in amounts to the United States of America, presaging the rapid growth of commercial relations between the two republics.

JOHN J. VALENTINE,
Vice-President and General Manager Wells, Fargo & Co.

II.—*DEPOSITS and PURCHASES of GOLD and SILVER BULLION during the fiscal year ended June 30, 1884.*

Description.	Mints.					Assay offices.					Total.
	Philadelphia.	San Francisco.	Carson.	Denver.	New Orleans.	New York.	Boisé.	Helena.	Charlotte.	Saint Louis.	
GOLD.											
United States bullion (domestic production)	$193,653 13	$17,966,265 39	$1,451,819 72	$1,360,655 54	.....	$7,061,188 89	$169,683 52	$734,269 64	$131,362 45	$10,698 05	$29,079,596 33
United States coin	89,704 97	4,922 90	.....	.....	$13,912 83	152,273 94	.....	.....	17 30	2,285 23	263,117 17
Foreign bullion	66,058 29	1,763,026 17	.....	.....	12,702 85	4,181,586 88	.....	.....	114 18	246 08	6,023,734 45
Foreign coin	15,264 45	3,566,641 06	.....	.....	29,564 89	5,476,076 78	.....	.....	58 01	7,856 26	9,095,461 45
Jewelers' bars, old plate, &c.	639,504 65	18,674 16	.....	3,435 83	35,343 15	1,134,689 10	.....	.....	952 72	32,169 65	1,864,769 26
Total	1,004,185 49	23,319,529 68	1,451,819 72	1,364,091 37	91,523 72	18,005,815 59	169,683 52	734,269 64	132,504 66	53,255 27	46,326,678 66
Redeposits { Fine bars	1,013 28	.....	.....	.....	.....	1,381,765 53	.....	.....	.....	.....	1,382,778 81
Redeposits { Unparted bars	1,661,709 45	98,418 48	.....	3,509 73	.....	883,377 19	296 11	.....	.....	.....	2,647,310 96
Total gold	2,666,908 22	23,417,948 16	1,451,819 72	1,367,601 10	91,523 72	20,270,958 31	169,979 63	734,269 64	132,504 66	53,255 27	50,356,768 43
SILVER.											
United States bullion (domestic production)	12,034,081 38	4,849,521 13	958,639 90	19,426 27	8,063,630 93	5,512,480 21	2,026 61	22,439 18	750 28	117 99	31,463,113 88
United States coin	137,339 38	2,163 95	92 51	.....	10,083 93	2,219 39	.....	.....	130 28	1 76	152,031 20
Foreign bullion	1,251 27	2,065,000 84	.....	.....	53,607 01	404,313 50	.....	.....	.....	569 91	2,524,742 53
Foreign coin	916,635 61	25,412 69	.....	.....	956,073 22	86,230 07	.....	.....	14 03	.....	1,984,365 62
Jewelers' bars, old plate, &c.	127,632 44	2,646 57	.....	.....	32,961 16	228,116 84	.....	.....	145 02	4,535 10	396,037 13
Total	13,216,940 08	6,944,745 18	958,732 41	19,426 27	9,116,356 25	6,233,360 01	2,026 61	22,439 18	1,039 61	5,224 76	36,520,290 36
Redeposits { Fine bars	897,767 46	94,169 73	.....	.....	.....	37,950 10	.....	.....	.....	.....	1,029,887 29
Redeposits { Unparted bars'	21,134 64	1,262 07	.....	.....	.....	25,804 73	6 40	.....	.....	.....	48,207 84
Total silver	14,135,842 18	7,040,176 98	958,732 41	19,426 27	9,116,356 25	6,297,114 84	2,033 01	22,439 18	1,039 61	5,224 76	37,598,385 49
Gold and silver deposits and purchases	14,221,125 57	30,264,274 86	2,410,552 13	1,383,517 64	9,207,879 97	24,239,175 60	171,710 13	756,708 82	133,544 27	58,480 03	82,846,969 02
Redeposits { Gold	1,662,722 73	98,418 48	.....	3,509 73	.....	2,265,142 72	296 11	.....	.....	.....	4,030,089 77
Redeposits { Silver	918,902 10	95,431 80	.....	.....	.....	63,754 83	6 40	.....	.....	.....	1,078,095 13
Total gold and silver	16,802,750 40	30,458,125 14	2,410,552 13	1,387,027 37	9,207,879 97	26,568,073 15	172,012 64	756,708 82	133,544 27	58,480 03	87,955,153 92

Description.	Mints.					Assay offices.					Total.
	Philadelphia.	San Francisco.	Carson.	Denver.	New Orleans.	New York.	Boise.	Helena.	Charlotte.	Saint Louis.	
GOLD.											
United States bullion (domestic production)	$222,711 49	$18,746,378 55	$1,598,716 38	$1,475,166 89		$7,536,303 67	$184,800 78	$865,167 58	$161,187 94	$16,767 08	$30,807,200 36
United States coin	76,419 57	4,232 06			$16,406 30	162,360 31			20 68	5,732 35	265,171 27
Foreign bullion	58,028 43	636,275 39			10,777 81	10,511,873 90			114 18	239 42	11,217,309 13
Foreign coin	7,648 71	1,233,411 62			11,851 86	5,071,248 23				4,761 62	6,328,922 04
Jewelers' bars, old plate, &c.	653,280 61	20,845 57		3,437 14	45,377 64	1,129,448 55			1,115 37	46,072 27	1,899,577 15
Total	1,018,088 81	20,641,143 19	1,598,716 38	1,478,604 03	84,413 61	24,411,234 66	184,800 78	865,167 58	162,438 17	73,572 74	50,518,179 95
Redeposits { Fine bars						1,238,875 51					1,238,875 51
Redeposits { Unparted bars	1,901,128 52			8,016 04		983,429 59			117 23		2,892,691 38
Total gold received and operated upon	2,919,217 33	20,641,143 19	1,598,716 38	1,486,620 07	84,413 61	26,633,539 76	184,800 78	865,167 58	162,555 40	73,572 74	54,649,746 84
SILVER.											
United States bullion (domestic production)	11,668,972 71	4,964,207 74	1,151,506 26	21,527 43	8,978,742 30	5,493,742 11	2,321 96	22,937 82	888 25	190 32	32,305,036 90
United States coin	399,933 08	8,490 98	15 94		4,822 44	1,899 54			100 19	1 12	415,263 29
Foreign bullion	279 94	1,568,864 91			49,555 24	676,227 63				1,390 00	2,296,317 72
Foreign coin	548,646 42	42,375 09			549,652 84	106,092 96			6 02		1,246,773 33
Jewelers' bars, old plate, &c.	133,386 86	1,980 26			31,814 90	233,096 54		41 28	184 94	6,835 24	407,339 97
Total	12,751,219 01	6,585,918 98	1,151,522 20	21,527 43	9,614,587 72	6,511,058 78	2,321 96	22,979 05	1,179 40	8,416 68	36,670,731 21
Redeposits { Fine bars	866,662 16	32,052 62				34,092 96					932,806 84
Redeposits { Unparted bars	26,947 82	61,214 65				27,019 64			1 10		115,183 21
Total silver received and operated upon	13,644,828 99	6,679,186 25	1,151,522 20	21,527 43	9,614,587 72	6,572,170 48	2,321 96	22,979 05	1,180 50	8,416 68	37,718,721 26
Gold and silver deposits and purchases	13,771,370 97	27,227,062 17	2,750,238 58	1,500,131 46	9,699,001 33	30,922,293 44	187,122 74	888,146 63	163,617 57	81,989 42	87,188,911 16
Redeposits { Gold	1,901,128 52			8,016 04		2,222,305 10			117 23		4,131,566 89
Redeposits { Silver	893,609 98	93,267 27				61,111 70			1 10		1,047,990 05
Total gold and silver received and operated upon	16,564,046 32	27,320,329 44	2,750,238 58	1,508,147 50	9,699,001 33	33,205,710 24	187,122 74	888,146 63	163,735 90	81,989 42	92,368,468 10

IV.—*DEPOSITS of GOLD of DOMESTIC PRODUCTION during the fiscal year ended June 30, 1884.*

Locality.	Mints.				Assay offices.					Total.
	Philadelphia.	San Francisco.	Carson.	Denver.	New York.	Boise.	Helena.	Charlotte.	Saint Louis.	
Alabama					$254 55					$254 55
Alaska		$50, 626 55								50, 626 55
Arizona		237, 252 50			7, 658 68					244, 911 18
California	$1, 105 14	6, 565, 944 18	$163, 392 95		7, 828 26				$132 48	6, 738, 403 01
Colorado	2, 587 49			$1, 346, 947 69	1, 121, 621 45				1, 795 76	2, 472, 952 39
Dakota	2, 459 22				3, 046, 228 65					3, 048, 687 87
Georgia	10, 727 14				51, 456 32			$52, 750 86		114, 934 32
Idaho	60 00	503, 834 35			124, 959 44	$131, 411 39	$28, 208 37		350 75	788, 824 30
Maine	45 51									45 51
Maryland	959 76									959 76
Michigan					19 87					19 87
Montana	1, 158 86	49, 873 02			635, 852 84		706, 061 27			1, 392, 945 99
Nebraska					156 97					156 97
Nevada		591, 024 30	1, 288, 426 77		94, 211 68				90 09	1, 973, 752 84
New Mexico	101, 401 04	3, 874 72		13, 707 85	40, 460 61				8, 328 97	167, 773 19
North Carolina	56, 490 77				5, 759 74			34, 569 08		96, 819 59
Oregon	380 32	403, 852 95				38, 272 18				442, 505 40
South Carolina	2, 783 18							43, 992 54		46, 775 72
Tennessee	110 88									110 88
Texas		97 86								97 86
Utah		21, 706 83			48, 565 50					70, 272 33
Virginia	2, 857 84							49 97		2, 907 81
Vermont					21, 094 33					21, 094 33
Washington Territory		29, 680 13								29, 680 13
Wyoming	4, 017 77	287 66								4, 305 43
Refined gold	947 70	9, 477, 966 27			1, 855, 059 50					11, 333, 973 47
Other sources	5, 560 51	30, 244 07								35, 804 58
Total gold	193, 653 13	17, 966, 265 39	1, 451, 819 72	1, 360, 655 54	7, 061, 188 89	169, 683 52	734, 269 64	131, 362 45	10, 696 05	29, 079, 596 33

Locality.	Mints.					Assay offices.					Total
	Philadelphia.	San Francisco.	Carson.	Denver.	New Orleans.	New York	Boisé.	Helena.	Charlotte.	Saint Louis.	
Alabama						$1 91					$1 91
Alaska		$517 55									517 55
Arizona		807, 830 38				57, 395 24					865, 225 62
California	$42 02	597, 582 15	$16, 865 95			525 13				$1 30	615, 016 55
Colorado	684 70			$19, 426 27		159, 836 37				56 99	180, 604 33
Dakota	21 96					77, 334 15					77, 356 11
Georgia	47 63					325 62			$236 89		609 64
Idaho	15, 348 13	53, 259 55				67, 901 19	$1, 571 03	$260 86		1 55	138, 342 31
Michigan	12, 907 88					17, 869 29					30, 777 17
Montana	8 11	106, 832 93				1, 904, 512 59		22, 178 32			2, 033, 531 95
Nebraska						2 42					2 42
Nevada		2, 390, 551 30	941, 773 95			5, 890 24				12	3, 338, 215 61
New Mexico	82, 314 79	5, 514 97				195, 212 71				58 03	283, 100 50
North Carolina	324 13					70 97			272 42		667 52
Oregon	7 14	4, 312 88					455 58				4, 775 60
South Carolina	46 83								241 47		288 30
Tennessee	40										40
Texas		394 94			$2, 005 57						2, 400 51
Utah		227, 609 40				1, 731, 271 60					1, 958, 881 00
Vermont						6 44					6 44
Virginia	12 84										12 84
Washington Territory		285 65									285 65
Wyoming	25 02	1 74									26 76
Refined silver	11, 921, 280 83	458, 374 33			8, 061, 625 36	1, 294, 324 34					21, 735, 604 86
Other sources	1, 008 97	196, 453 36									197, 462 33
Total silver	12, 034, 081 38	4, 849, 521 13	958, 639 90	19, 426 27	8, 063, 630 93	5, 512, 480 21	2, 026 61	22, 439 18	750 28	117 99	31, 463, 113 88

VI.—*DEPOSITS of GOLD of DOMESTIC PRODUCTION during the calendar year ended December* 31, 1884.

Locality.	Mints.				Assay offices.					Total.
	Philadelphia.	San Francisco.	Carson.	Denver.	New York.	Boisé.	Helena.	Charlotte.	Saint Louis.	
Alabama					$436 00			$304 84		$740 84
Alaska		$24, 253 09								24, 253 09
Arizona	$160 07	267, 192 99			532 78					267, 885 84
California	1, 941 21	6, 294, 604 02	$168, 567, 42		8, 972 78				$83 31	6, 474, 258 74
Colorado	12, 050 27	272 38		$1, 420, 782 84	1, 421, 545 48				6, 974 03	2, 861, 625 00
Dakota	2, 459 21				3, 008, 270 98					3, 010, 730 19
Georgia	4, 054 27				33, 959 96			76, 986 26		115, 000 49
Idaho	1, 549 75	388, 863 85			44, 920 89	$135, 397 94	$125, 699 46		449 67	696, 881 56
Montana	530 40	82, 956 61			647, 298 33		739, 468 13			1, 470, 253 47
Nevada		330, 656 68	1, 430, 148 98		83, 381 82				90 09	2, 344, 277 57
New Mexico	129, 923 71	19, 172 26		53, 528 95	16, 269 85				8, 639 47	227, 533 74
North Carolina	46, 554 36				8, 293 45			39, 014 30		88, 861 11
Oregon	1, 975 24	409, 682 17				49, 402 84				461, 060 25
South Carolina	3, 627 67							44, 883 04		48, 510 71
Tennessee	123 38									123 38
Utah		27, 157 84			28, 280 47					55, 438 31
Vermont					57, 649 21					57, 649 21
Virginia	2, 024 20									2, 024 20
Washington Territory		34, 878 03								34, 878 03
Wyoming	3, 854 87			855 11					530 49	5, 240 47
Refined bullion	1, 866 77	10, 262, 213 38			2, 180, 352 21					12, 444, 432 36
Other sources	10, 016 10	104, 385 22			1, 140 98					115, 542 30
Total gold	222, 711 48	18, 746, 378, 52	1, 598, 716 40	1, 475, 166 90	7, 536, 303 69	184, 800 78	865, 167 59	161, 187 94	16, 767 06	30, 807, 200 36

VII.—*DEPOSITS of SILVER of DOMESTIC PRODUCTION during the calendar year ended December 31, 1884.*

Locality.	Mints.					Assay offices.					Total.
	Philadelphia.	San Francisco.	Carson.	Denver.	New Orleans.	New York.	Boisé.	Helena.	Charlotte.	Saint Louis.	
Alabama						$1 91			$2 09		$4 00
Alaska		$231 97									231 97
Arizona	$167 70	485, 677 36				80, 632 89					566, 477 45
California	40 27	430, 480 12	$17, 950 91			539 22				$1 06	449, 011 58
Colorado	746 08	1 77		$21, 525 59		73, 045 05				128 64	95, 447 13
Dakota	21 96					38, 341 91					38, 363 87
Georgia	14 82					303 51			382 97		701 30
Idaho	5 71	54, 398 46				6, 116 19	$1, 687 02	$1, 413 96		1 51	63, 622 85
Michigan	15, 028 71					23, 260 31					38, 289 02
Montana	1 79	560 23				1, 202, 289 43		21, 523 87			1, 224, 375 32
Nevada		2, 358, 312 72	1, 133, 555 36			1, 245 70				12	3, 493, 113 90
New Mexico	31, 765 22	5, 883 28				227, 011 78				68 02	264, 728 30
North Carolina	242 61					51 50			273 98		568 09
Oregon	19 25	3, 945 96					634 96				4, 600 17
South Carolina	59 79								229 19		288 98
Utah		286, 570 44				2, 038, 732 87					2, 325, 303 32
Virginia	4 42										4 42
Washington Territory		356 10									356 10
Wyoming	23 93									6 22	30 15
Refined bullion	11, 620, 054 28	988, 243 06			$8, 978, 742 29	1, 799, 581 86					23, 386, 621 47
Other sources	764 47	349, 544 59				2, 588 48					352, 897 54
Total silver	11, 668, 960 99	4, 964, 206 06	1, 151, 506 27	21, 525 59	8, 978, 742 29	5, 493, 742 11	2, 321 98	22, 937 83	888 23	205 87	32, 305, 036 92

VIII.—*GOLD and SILVER of DOMESTIC PRODUCTION deposited at the min assay offices from their organization to the close of the fiscal year ended June* 30, 1

Locality.	Gold.	Silver.	Tota
Alabama	$222, 984 45	$8 06	$222
Alaska	138, 719 50	1, 050 36	139
Arizona	3, 451, 186 51	13, 242, 548 99	16, 693
California	729, 782, 449 08	3, 670, 866 84	733, 453
Colorado	44, 431, 821 87	22, 566, 463 12	66, 998
Dakota	20, 332, 531 76	237, 200 97	20, 569
Georgia	8, 158, 184 83	2, 134 42	8, 160
Idaho	26, 684, 498 37	1, 230, 285 07	27, 914
Indiana	40 13		
Maine	5, 638 20	22 00	5
Maryland	2, 559 91	59	2
Massachusetts		917 56	
Michigan	159 58	3, 559, 116 89	3, 559
Montana	54, 345, 342 33	10, 071, 448 14	64, 416
Nebraska	156 97	2 42	
Nevada	20, 497, 510 25	88, 995, 652 43	109, 493
New Hampshire	11, 020 55		11
New Mexico	1, 950, 546 38	4, 914, 811 16	6, 865
North Carolina	10, 931, 022 38	48, 012 72	10, 979
Oregon	17, 835, 054 76	51, 166 65	17, 886
South Carolina	1, 515, 629 82	746 06	1, 516
Tennessee	87, 286 00	7 68	87
Texas	97 86	2, 400 51	2
Utah	676, 027 52	17, 627, 286 38	18, 303
Vermont	32, 076 10	49 94	32
Virginia	1, 710, 641 48	177 85	1, 710
Washington Territory	315, 315 34	967 02	316
Wyoming	734, 201 00	11, 856 77	746
Refined bullion	257, 048, 392 52	113, 830, 795 01	370, 879
Parted from silver	16, 699, 768 48		16, 699
Contained in silver	9, 322, 268 97		9, 322
Parted from gold		7, 073, 251 68	7, 073
Contained in gold		526, 284 79	526
Other sources	10, 672, 060 26	33, 411, 329 84	44, 083
Total	1, 237, 595, 193 16	321, 076, 861 92	1, 558, 672

IX.—*GOLD and SILVER of DOMESTIC PRODUCTION deposited at the mint assay offices from their organization to the close of the calendar year ended Decemb* 1884.

Locality.	Gold.	Silver.	Total
Alabama	$223, 470 25	$16 05	$223,
Alaska	158, 600 63	1, 241 10	159,
Arizona	3, 594. 628 40	13, 377, 745 41	16, 972,
California	733, 180, 024 88	3, 754, 651 15	736, 934,
Colorado	46, 237, 635 61	22, 627, 000 08	68, 864,
Dakota	21, 828, 159 57	264, 307 95	22, 092,
Georgia	8, 214, 574 46	2, 524 02	8, 217,
Idaho	27, 198, 420 11	1, 281, 361 82	28, 479,
Maine	5, 638 20	22 02	5,
Michigan	156 94	3, 581, 318 64	3, 581,
Montana	55, 394, 904 98	10, 636, 352 83	66, 031,
Nevada	21, 688, 883 48	90, 862. 871 22	112, 551,
New Mexico	2, 099, 487 93	5, 079, 110 05	7, 178,
North Carolina	10, 975, 902 53	48, 282 51	11, 024
Oregon	18, 177, 258 86	54, 683 93	18, 231
South Carolina	1, 542, 811 45	897 60	1, 543
Tennessee	87, 409 38	7 68	87
Utah	706, 767 60	18, 782, 290 22	19, 489
Vermont	71, 442 18	49 94	71
Virginia	1, 711, 650 23	180 45	1, 711
Washington Territory	341, 576 98	1, 237 62	342
Wyoming	738, 832 53	11, 883 62	750
Refined bullion	264, 664, 433 28	127, 213, 775 42	391, 878
Other sources	36, 804, 228 17	41, 347, 400 87	78, 15
Total	1, 255, 646, 798 63	338, 929, 212 20	1, 594, 57

Denomination.	Philadelphia.		San Francisco.		Carson.		New Orleans.		Total.	
	Pieces.	Value.	Pieces.	Value.	Pieces.	Value.	Pieces.	Value.	Pieces.	Value.
GOLD.										
Double eagles	54	$1,080 00	1,123,000	$22,460,000 00	65,241	$1,304,820 00	.....	.....	1,188,295	$23,765,900 00
Eagles	139,298	1,392,980 00	45,250	452,500 00	18,756	187,560 00	.....	.....	203,304	2,033,040 00
Half eagles	273,046	1,365,230 00	126,200	631,000 00	23,958	119,790 00	.....	.....	423,204	2,116,020 00
Three dollars	985	2,955 00	.....	.....	.....	.....	.....	.....	985	2,955 00
Quarter eagles	1,972	4,930 00	.....	.....	.....	.....	.....	.....	1,972	4,930 00
Dollars	9,979	9,979 00	.....	.....	.....	.....	.....	.....	9,979	9,979 00
Total gold	425,334	2,777,154 00	1,294,450	23,543,500 00	107,955	1,612,170 00	.....	.....	1,827,739	27,932,824 00
SILVER.										
Dollars	13,230,930	13,230,930 00	4,800,000	4,800,000 00	1,164,000	1,164,000 00	8,905,000	$8,905,000 00	28,099,930	28,099,930 00
Half dollars	8,930	4,465 00	.....	.....	.....	.....	.....	.....	8,930	4,465 00
Quarter dollars	15,330	3,832 50	.....	.....	.....	.....	.....	.....	15,330	3,832 50
Dimes	6,151,603	615,160 30	500,000	50,000 00	.....	.....	.....	.....	6,651,603	665,160 30
Total silver	19,406,793	13,854,387 80	5,300,000	4,850,000 00	1,164,000	1,164,000 00	8,905,000	8,905,000 00	34,775,793	28,773,387 80
MINOR.										
Five cents	15,374,905	768,745 25	.....	.....	.....	.....	.....	.....	15,374,905	768,745 25
Three cents	8,162	244 86	.....	.....	.....	.....	.....	.....	8,162	244 86
One cent	40,571,962	405,719 62	.....	.....	.....	.....	.....	.....	40,571,962	405,719 62
Total minor	55,955,029	1,174,709 73	.....	.....	.....	.....	.....	.....	55,955,029	1,174,709 73
Total coinage	75,787,156	17,806,251 53	6,594,450	28,393,500 00	1,271,955	2,776,170 00	8,905,000	8,905,000 00	92,558,561	57,880,921 53

XI.—*COINAGE EXECUTED during the calendar year ended December* 31, 1884.

Denomination.	Philadelphia.		San Francisco.		Carson City.		New Orleans.		Total.	
	Pieces.	Value.	Pieces.	Value.	Pieces.	Value.	Pieces.	Value.	Pieces.	Value.
GOLD.										
Double-eagles	71	$1,420 00	916,000	$18,320,000 00	81,139	$1,622,780 00	.....	.....	997,210	$19,944,200 00
Eagles	76,905	769,050 00	124,250	1,242,500 00	9,925	99,250 00	.....	.....	211,080	2,110,800 00
Half-eagles	191,048	955,240 00	177,000	885,000 00	16,402	82,010 00	.....	.....	384,450	1,922,250 00
Three-dollars	1,106	3,318 00	.....	.....	.....	.....	.....	.....	1,106	3,318 00
Quarter-eagles	1,993	4,982 50	.....	.....	.....	.....	.....	.....	1,993	4,982 50
Dollars	6,206	6,206 00	.....	.....	.....	.....	.....	.....	6,206	6,206 00
Total gold	277,329	1,740,216 50	1,217,250	20,447,500 00	107,466	1,804,040 00	.....	.....	1,602,045	23,991,756 50
SILVER.										
Dollars	14,070,875	14,070,875 00	3,200,000	3,200,000 00	1,136,000	1,136,000 00	9,730,000	9,730,000 00	28,136,875	28,136,875 00
Half-dollars	5,275	2,637 50	.....	.....	.....	.....	.....	.....	5,275	2,637 50
Quarter-dollars	8,875	2,218 75	.....	.....	.....	.....	.....	.....	8,875	2,218 75
Dimes	3,366,380	336,638 00	564,969	56,496 90	.....	.....	.....	.....	3,931,349	393,134 90
Total silver	17,451,405	14,412,369 25	3,764,969	3,256,496 90	1,136,000	1,136,000 00	9,730,000	9,730,000 00	32,082,374	28,534,866 15
MINOR.										
Five-cents	11,273,942	563,697 10	.....	.....	.....	.....	.....	.....	11,273,942	563,697 10
Three-cents	5,642	169 26	.....	.....	.....	.....	.....	.....	5,642	169 26
One-cent	23,261,742	232,617 42	.....	.....	.....	.....	.....	.....	23,261,742	232,617 42
Total minor	34,541,326	796,483 78	.....	.....	.....	.....	.....	.....	34,541,326	796,483 78
Total coinage	52,270,060	16,949,069 53	4,982,219	23,703,996 90	1,243,466	2,940,040 00	9,730,000	9,730,000 00	68,225,745	53,323,106 43

[H.—*STATEMENT OF COINAGE from the ORGANIZATION of the MINT to the close of the fiscal year ended June 30, 1884.*

GOLD COINAGE.

Period.	Double-eagles.	Eagles.	Half-eagles.	Three-dollars.	Quarter-eagles.	Dollars.	Total.
to 1848	.....	$25, 662, 270	$45, 265, 355	.....	$5, 413, 815 00	.....	$76, 341, 440 00
to 1873	$646, 727, 980	29, 851, 820	22, 994, 390	$1, 169, 913	20, 804, 702 50	$19, 015, 633	740, 564, 438 50
.....	48, 283, 900	383, 480	809, 780	125, 460	516, 150 00	323, 920	50, 442, 690 00
.....	32, 748, 140	599, 840	203, 655	60	2, 250 00	20	33, 553, 965 00
.....	37, 896, 720	153, 610	71, 800	135	53, 052 50	3, 645	38, 178, 962 50
.....	43, 941, 700	56, 200	67, 335	4, 464	5, 780 00	2, 220	44, 078, 199 00
.....	51, 406, 340	155, 490	688, 680	137, 850	408, 900 00	1, 720	52, 798, 980 00
.....	37, 234, 340	1, 031, 440	1, 442, 130	109, 182	1, 166, 800 00	3, 020	40, 986, 912 00
.....	21, 515, 360	18, 836, 320	15, 790, 860	9, 090	3, 075 00	3, 030	56, 157, 735 00
.....	15, 845, 520	33, 389, 050	29, 982, 180	4, 698	9, 140 00	3, 276	78, 733, 864 00
.....	14, 563, 920	44, 369, 410	30, 473, 955	75	62 50	6, 025	89, 413, 447 50
.....	27, 526, 120	6, 611, 790	1, 775, 360	4, 665	10, 137 50	8, 855	35, 936, 927 50
.....	23, 765, 900	2, 033, 040	2, 116, 020	2, 955	4, 930 00	9, 979	27, 932, 824 00
Total.	1, 000, 955, 940	163, 133, 760	151, 682, 000	1, 568, 547	28, 398, 795 00	19, 381, 343	1, 365, 120, 385 00

SILVER COINAGE.

Period.	Trade-dollars.	Dollars.	Half-dollars.	Quarter-dollars.	Twenty-cents.
to 1852	.....	$2, 506, 890	$66, 249, 153 00	$3, 999, 040 50	.....
to 1873	.....	5, 538, 948	33, 596, 082 50	18, 002, 178 00	.....
.....	$3, 588, 900	.....	1, 438, 930 00	458, 515 50	.....
.....	5, 697, 500	.....	2, 853, 500 00	623, 950 00	$5, 858
.....	6, 132, 050	.....	4, 985, 525 00	4, 106, 262 50	263, 560
.....	9, 162, 900	.....	9, 746, 350 00	7, 584, 175 00	1, 440
.....	11, 378, 010	8, 573, 500	3, 875, 255 00	3, 703, 027 50	142
.....	.....	27, 227, 500	2 5 00	112 50	.....
.....	.....	27, 933, 750	3, 275 00	3, 837 50	.....
.....	.....	27, 637 955	4, 677 50	3, 638 75	.....
.....	.....	27, 772, 075	5, 537 50	3, 268 75	.....
.....	.....	28, 111, 119	2, 759 50	4, 079 25	.....
.....	.....	28, 099, 930	4, 465 00	3, 832 50	.....
Total.....	35, 959, 360	183, 401, 667	122, 765, 735 00	38, 495, 918 75	271 000

Period	Dimes.	Half-dimes.	Three-cents.	Total.
53 to 1852	$3, 890, 062 50	$1, 823, 298 90	$744, 927 00	$79, 213, 371 90
53 to 1873	5, 170, 733 00	3, 083, 648 00	536, 923 20	65, 928, 512 70
74	497, 255 80	.....	.....	5, 983, 601 30
75	889, 560 00	.....	.....	10, 070, 368 00
76	3, 639, 105 00	.....	.....	19, 126, 502 50
77	2, 055, 070 00	.....	.....	28, 549, 935 00
78	760, 891 00	.....	.....	28, 290, 825 50
79	45 00	.....	.....	27, 227, 882 50
80	1, 575 00	.....	.....	27, 942, 437 50
81	3, 695 50	.....	.....	27, 649, 966 75
82	2, 507 50	.....	.....	27, 783, 3?8 75
83	717, 511 90	.....	.....	28, 835, 470 15
84	665, 160 30	.....	.....	28, 773, 387 80
Total	18, 298, 172 50	4, 906, 946 90	1, 281, 850 20	405, 375, 650 35

MINOR COIN.

Period.	Five-cents.	Three-cents.	Two-cents.	Cents.	Half-cents.	Total.
83 to 1873	$5, 276, 140 00	$805, 350 00	$912, 020 00	$4, 886, 452 44	$39, 926 11	$11, 919, 888 55
74	244, 350 00	29, 640 00	.....	137, 935 00	.....	411, 925 00
75	94, 650 00	12, 540 00	.....	123, 185 00	.....	230, 375 00
76	132, 700 00	7, 560 00	.....	120, 090 00	.....	260, 350 00
77	25, 250 00	.....	.....	36, 915 00	.....	62, 165 00
78	80 00	48 00	.....	30, 566 00	.....	30, 694 00
79	1, 175 00	984 00	.....	95, 639 00	.....	97, 798 00
80	1, 247 50	982 50	.....	267, 741 50	.....	269, 971 50
81	177 75	32, 416 65	.....	372, 515 55	.....	405, 109 95
82	220, 038 75	104 25	.....	424, 614 75	.....	644, 757 75
83	1, 022, 774 40	858 57	.....	404, 674 19	.....	1, 428, 307 16
84	768, 745 25	244 86	.....	405, 719 62	.....	1, 174, 709 73
Total	7, 787, 328 65	890, 728 83	912, 020 00	7, 306, 048 05	39, 926 11	16, 936, 051 64

XIII.—*Bars manufactured during the fiscal year ended June* 30, 1884.

GOLD.										
Fine bars	$521,095 65				$13,161,450 71					$13,682,546 36
Standard bars					1,388,946 66					1,388,946 66
Unparted bars		$5,450 64		$1,367,601 10		$169,979 63	$734,269 64	$132,504 66	$53,255 27	2,463,060 94
Sterling bars					613,234 34					613,234 34
Mint bars					5,727,797 27					5,727,797 27
Total gold	521,095 65	5,450 64		1,367,601 10	20,891,428 98	169,979 63	734,269 64	132,504 66	53,255 27	23,875,585 57
SILVER.										
Fine bars	48,270 10	1,234,578 69			6,081,756 65					7,364,605 44
Standard bars					37,162 64					37,162 64
Unparted bars		61 37		19,426 27		2,033 01	22,439 18	1,039 61	5,224 76	50,224 20
Sterling bars	6,012 01									6,012 01
Mint bars					181,719 13					181,719 13
Total silver	54,282 11	1,234,640 06		19,426 27	6,300,639 42	2,033 01	22,439 18	1,039 61	5,224 76	7,639,724 42
Total gold and silver	575,377 76	1,240,090 70		1,387,027 37	27,192,068 40	172,012 64	756,708 82	133,544 27	58,480 03	31,515,309 99

XIV.—*BARS MANUFACTURED during the calendar year ended December* 31, 1884.

Description.	Mints.				Assay offices.					Total.
	Philadelphia.	San Francisco.	Carson.	Denver.	New York.	Boisé.	Helena.	Charlotte.	Saint Louis.	
GOLD.										
Fine bars	$401,783 24				$14,199,032 63					$14,600,815 87
Standard bars					1,693,560 58					1,693,560 58
Unparted bars		$5,450 64		$1,486,620 07	7,302 21	$184,800 78	$865,167 57	$162,555 41	73,572 73	2,785,469 41
Mint bars					7,844,635 74					7,844,635 74
Sterling bars					3,655,747 44					3,655,747 44
Total gold	401,783 24	5,450 64		1,486,620 07	26,900,278 60	184,800 78	865,167 57	162,555 41	73,572 73	30,080,229 04
SILVER.										
Fine bars	21,716 71	1,958,886 13			6,199,434 50					8,180,037 34
Sterling bars	6,884 64									6,884 64
Standard bars					32,925 78					32,925 78
Unparted bars		61 37		21,527 42	120,814 27	2,321 99	22,979 05	1,180 50	8,416 69	177,301 29
Mint bars					181,719 13					181,719 13
Total silver	28,601 35	1,958,947 50		21,527 42	6,534,893 68	2,321 99	23,979 05	1,180 50	8,416 69	8,578,868 18
Total gold and silver	430,384 59	1,964,398 14		1,508,147 49	33,435,172 28	187,122 77	888,146 62	163,735 91	81,989 42	38,659,097 22

'EMENT showing the NUMBER OF OUNCES, STANDARD WEIGHT, nd SILVER BULLION operated upon in the REFINERIES of the UNITED MINTS at PHILADELPHIA, SAN. FRANCISCO, and CARSON, and the FFICE at NEW YORK.

NEW YORK ASSAY OFFICE.

Calendar year 1884.	Sent to refineries.		
	Bullion containing gold.		Bullion free from gold.
	Gold, standard weight.	Silver, standard weight.	Silver, standard weight.
.....	36, 257, 000	442, 621. 00	11, 402. 00
.....	35, 393, 000	273, 446. 00	29, 752. 00
.....	45, 671, 000	366, 465. 00	33, 395. 00
.....	32, 649, 000	337, 066. 00	23, 169. 00
.....	33, 106, 000	293, 981. 00	12, 291. 00
.....	169, 748, 000	576, 581. 00	31, 413. 00
.....	64, 245, 000	212, 331. 00	226, 497. 00
.....	94, 922, 000	380, 027. 00	118, 064. 00
.....	76, 757, 000	451, 381. 00	89, 726. 00
.....	63, 344, 000	434, 902. 00	56, 075. 00
.....	43, 808, 000	438, 383. 00	31, 670. 00
.....	695, 900, 000	4, 207, 184. 00	663, 454. 00
			4, 207, 184. 00
er	.....	.....	4, 870, 638. 00

PHILADELPHIA MINT.

.....	10, 877, 680	22, 240. 24	99, 653. 21
.....	9, 928, 470	6, 635. 19	85, 102. 75
.....	12, 435, 460	24, 892. 79	68, 032. 80
.....	10, 533, 920	7, 279. 56	32, 073. 57
.....	10, 040, 980	7, 180. 16	33, 495. 40
.....	10, 970, 220	18, 177. 91	9, 985 96
.....	14, 958, 040	15, 408. 67	26, 185. 19
.....	13, 454, 630	19, 129. 68	30, 162. 10
.....	12, 275, 880	9, 703. 70	25, 187. 71
.....	15, 740, 490	6, 803. 33	35, 820. 04
.....	15, 170, 010	9, 885. 08	30, 061. 36
.....	12, 717, 730	16, 162. 50	14, 095. 95
.....	149, 103, 510	163, 498. 81	539, 856. 04
			163, 498. 81
er	.....	.....	703, 354. 85

SAN FRANCISCO MINT.

.....	42, 400, 335	399, 148. 13	135, 514. 61
.....	33, 396, 977	491, 386. 09	79, 563. 51
.....	34, 218, 866	343, 925. 55	66, 843. 85
.....	38, 934, 080	330, 040. 90	60, 095. 53
.....	49, 100, 114	324, 504. 25	50, 872. 52
.....	14, 329, 818	113, 576. 06	1, 355. 27
.....	56, 506, 235	390, 947. 15	3, 028. 20
.....	44, 958, 615	299, 336. 64	11, 269. 97
.....	46, 959, 860	353, 682. 36	47, 692. 93
.....	39, 855, 424	376, 055. 34	18, 272. 00
.....	35, 511, 898	287, 971. 57	56, 034. 49
.....	35, 352, 125	284, 975. 02	87, 425. 99
.....	472, 524, 297	3, 975, 549. 06	617, 988. 87
			3, 975, 549. 06
er	.....	.....	4, 593, 537. 93

XV.—*STATEMENT showing the NUMBER OF OUNCES, STANDARD WEIGHT, of GOLD and SILVER BULLION operated upon in the REFINERIES of the UNITED STATES MINTS, &c.*—Continued.

CARSON MINT.

Calendar year 1884.	Sent to refineries.		
	Bullion containing gold.		Bullion free from gold.
	Gold, standard weight.	Silver, standard weight.	Silver, standard weight.
January	9, 263 444	85, 573. 16	6, 782. 69
February	9, 316, 133	109, 378. 89	
March	7, 453, 062	122, 688. 98	
April	8, 782, 551	126, 343. 50	
May	12, 206, 027	112, 654. 51	20, 897. 31
June			
July	1, 897, 265	80, 365. 35	
August	12, 584, 502	125, 037. 45	
September	11, 271, 176	118, 241. 72	
October	10, 438, 679	126, 270. 12	
November	4, 134, 461	78. 563. 99	
December	6, 678, 397	98, 132. 37	
Total	94, 025, 697	1, 133, 250. 04	27, 680. 00
			1, 133, 250. 04
Total silver			1, 160, 930. 04

RECAPITULATION.

New York assay office	695, 900, 000	4, 207, 184. 00	663, 454. 00
Philadelphia mint	149, 103, 510	163, 498. 81	539, 856. 04
San Francisco mint	472, 524, 295	3, 975, 549. 06	617, 993. 87
Carson mint	94, 025, 697	1, 133, 250. 04	27, 680. 00
Total	1, 411, 553, 502	9, 479, 481. 91	1, 848, 973. 91
			9, 479, 481. 91
Total silver			11, 328, 460. 82

XVI.—*STATEMENT showing the NUMBER of STANDARD OUNCES of SILVER BULLION on hand at the COINAGE MINTS and NEW YORK ASSAY OFFICE, January* 1, 1884, *and December* 31, 1884.

	Philadelphia.	San Francisco.	New Orleans.	Carson.	New York.	Total.
January 1, 1884	2, 331, 632. 80	458, 261. 23	1, 498, 840. 86	484, 516. 39	990, 783. 51	5, 764, 034. 79
December 31, 1884	1, 655, 099. 44	1, 205, 542. 67	1, 381, 039. 20	490, 849. 62	971, 143. 42	5, 703, 674. 35
Increase		747, 281. 44		6, 333. 23		753, 614. 67
Decrease	676, 533. 36		117, 801. 66		19, 640. 09	813, 975. 11

Net decrease, 60,360.44 standard ounces.

.—STATEMENT showing the STANDARD OUNCES of SILVER BULLION based at the COINAGE MINTS during the calendar year 1884, and coining value e same.

Mints.	Standard ounces.	Coining value.
lphia	*11, 398, 706. 37	$13, 263, 949. 23
ncisco	3, 476, 802. 31	4, 045, 733. 58
	987, 154. 65	1, 148, 689. 04
leans	8, 261, 294. 61	9, 613, 142. 85
otal	24, 123, 957. 94	28, 071, 514. 69

* Including 54,688.99 standard ounces purchased for subsidiary coinage.

I.—*MONTHLY PRICE of SILVER BULLION 925 thousandths fine in LONDON during the calendar year 1884,*

Months.	Highest.	Lowest.	Average.
	51	50⅝	50. 865
y	51⅛	51	51. 135
	51⅛	50⅞	51. 937
	51	50⅞	50. 757
	50 13/16	50⅝	50. 839
	50 13/16	50⅝	50. 800
	50⅞	50 11/16	50. 788
	50⅞	50⅝	50. 779
er	50 15/16	50⅝	50. 738
	50⅞	50 7/8	50. 724
er	50 7/8	49 15/16	50. 007
er	49⅞	49⅛	49. 649
verage for the year	51⅛	49⅛	50. 751

XIX.—*STATEMENT of IMPORTS and EXPORTS of GOLD and SILVER … the calendar year ended December* 31, 1884.

[Reported by Chief of Bureau of Statistics.]

IMPORTS.

Ports.	BULLION.						Total and bul
	Gold.			Silver.			
	Bars.	Other bullion.	Total.	Bars.	Other bullion.	Total.	
NEW YORK, N. Y.							
January, 1884	$1,200	$12,844	$14,044	$23,020	$140	$23,160	
February, 1884	3,006	15,939	18,945	3,330	.....	3,330	
March, 1884	3,240	9,274	12,514	.....	2,000	2,000	
April, 1884	5,855	13,088	18,943	321	6,600	6,921	
May, 1884	1,475	11,599	13,074	1,520	7,890	9,410	
June, 1884	3,182	22,708	25,890	910	8,300	9,210	
July, 1884	732,975	18,929	751,904	2,376	8,464	10,840	
August, 1884	1,466,885	12,831	1,479,716	300	11,200	11,500	1,
September, 1884	70,085	13,647	83,732	1,455	14,000	15,455	
October, 1884	1,451,223	16,272	1,467,495	462	27,676	28,138	1,
November, 1884	3,416,334	251,550	3,668,384	17,625	935	18,560	3,
December, 1884	62,644	25,731	88,375	.....	271	271	
Total	7,218,604	424,412	7,643,016	51,319	87,476	138,795	7,
SAN FRANCISCO, CAL.							
January, 1884	.....	102,992	102,992	4,000	150,326	154,326	
February, 1884	.....	63,020	63,020	5,200	143,766	148,966	
March, 1884	.....	13,050	13,050	.....	187,513	187,513	
April, 1884	.....	35,606	35,606	.....	149,553	149,553	
May, 1884	.....	32,200	32,200	8,775	191,967	200,742	
June, 1884	.....	39,028	39,028	.....	97,112	97,112	
July, 1884	.....	88,117	88,117	1,000	150,894	151,894	
August, 1884	.....	40,060	40,060	100,595	91,488	192,083	
September, 1884	.....	66,953	66,953	67,805	89,475	157,280	
October, 1884	.....	63,789	63,789	161,762	.....	161,762	
November, 1884	.....	120,801	120,801	16,218	78,073	94,291	
December, 1884	.....	71,402	71,402	.....	203,900	203,900	
Total	.....	737,018	737,018	365,355	1,534,067	1,899,422	2,
ALL OTHER PORTS.							
January, 1884	5,687	1,184	6,871	18,107	50,176	68,283	
February, 1884	1,500	1,196	2,696	1,973	20,901	22,874	
March, 1884	.....	2,400	2,400	33,806	25,600	59,406	
April, 1884	35,545	8,439	43,984	51,202	19,188	70,390	
May, 1884	35,220	16,097	51,317	33,626	17,837	51,463	
June, 1884	450	5,145	5,595	48,736	28,044	76,780	
July, 1884	.....	115,171	115,171	55,261	39,638	94,899	
August, 1884	8,000	31,402	39,402	42,161	28,838	70,999	
September, 1884	450	19,520	19,970	14,652	13,377	28,029	
October, 1884	6,928	45,800	52,728	157,770	86,775	244,545	
November, 1884	.....	21,345	21,345	35,573	66,598	102,171	
December, 1884	.....	6,000	6,000	195,124	133,758	328,882	
Total	93,780	273,699	367,479	687,991	530,780	1,218,721	1,
Total imports bullion	7,312,384	1,435,129	8,747,513	1,104,665	2,152,273	3,256,938	12,

TATEMENT of IMPORTS and EXPORTS of GOLD and SILVER, &c.—Continued.

IMPORTS.

ta.	COIN.						
	Gold.			Silver.			Total gold and silver coin.
	American.	Foreign.	Total.	American.*	Foreign.	Total.	
K, N. Y.							
1.....	$14,268	$32,375	$46,643	$50,364	$404,231	$454,595	$501,238
84	24,165	12,845	37,010	55,051	334,508	389,559	426,569
.....	17,830	179,181	197,011	141,554	233,381	374,935	571,946
.....	11,518	2,736,335	2,747,853	25,926	198,076	224,002	2,971,855
.....	119,067	142,295	261,362	22,474	208,125	230,599	491,961
.....	59,951	1,932,830	1,992,781	36,415	216,762	253,177	2,245,958
.....	162,972	1,113,079	1,276,051	34,462	311,115	345,577	1,621,628
.....	248,932	895,121	1,144,053	73,568	240,266	313,834	1,457,887
884	275,627	985,768	1,261,395	38,720	151,455	190,175	1,451,570
1.....	153,024	665,660	818,684	48,316	203,227	251,543	1,070,227
884.....	837,010	3,514,958	4,351,968	47,906	110,381	158,287	4,510,255
884.....	289,549	1,477,728	1,767,277	34,161	106,048	140,209	1,907,486
.....	2,213,913	13,688,175	15,902,088	608,917	2,717,575	3,326,492	19,228,580
SCO, CAL.							
1.....	3,860	348,023	351,883	4,297	149,756	154,053	505,936
84	1,029	150,132	151,161	2,200	133,500	135,700	286,861
.....	2,000	113,099	115,099	1,208	180,718	181,926	297,025
.....	6,900	152,850	159,750	14,890	153,933	168,823	328,573
.....	1,185	52,867	54,052	2,147	106,073	108,220	162,272
.....	2,800	4,902	7,702	1,329	92,574	93,903	101,605
.....	4,618	35,144	39,762	2,175	84,426	86,601	126,363
.....	22,311	9,674	31,985	2,218	153,619	155,837	187,822
884	9,225	24,333	33,558	4,564	150,750	155,314	188,872
1.....	22,498	11,225	33,723	15,978	269,715	285,693	319,416
884	5,760	12,100	17,860	1,096	321,275	322,371	340,231
884.....	16,103	162,536	178,639	40,535	168,279	208,814	387,453
.....	98,289	1,076,885	1,175,174	92,637	1,964,618	2,057,255	3,232,429
R PORTS.							
1.....	.....	2,980	2,980	6,692	302,126	308,818	311,798
84	147,500	1,972	149,472	1,600	174,026	175,626	325,098
.....	561,020	2,107	563,127	798	397,101	397,894	961,021
.....	2,163	2,130	4,293	400	386,186	386,586	390,879
.....	1,207,990	6,536	1,214,526	1,906	464,355	466,261	1,680,787
.....	1,638	1,965	3,603	4,534	516,636	521,170	524,773
.....	275	11,823	12,098	2,200	513,007	515,207	527,305
.....	9,000	14,084	23,084	3,454	500,459	503,904	526,988
884	.....	12,064	12,064	.....	458,192	458,192	470,256
1.....	.....	14,983	14,983	671	1,770,784	1,771,455	1,786,438
884	2,190	10,356	12,546	1,346	668,219	669,565	682,111
884.....	3,155	116,951	120,106	.....	689,414	689,414	809,520
.....	1,984,931	197,951	2,182,882	23,596	6,840,496	6,864,092	8,996,974
ports, coin.	4,247,133	14,963,011	19,210,144	725,150	11,522,689	12,247,839	31,457,983

f silver coin classified as "American" and "Foreign." Trade dollars not separately stated

XIX.—*STATEMENT of IMPORTS and EXPORTS of GOLD and SILVER, &c.*—Continued.

EXPORTS (DOMESTIC).

Customs districts.	BULLION.						
	Gold.			Silver.			Total gold and silver.
	United States mint or assay office.	Other bullion.	Total.	United States mint or assay office.	Other bullion.	Total.	
NEW YORK, N. Y.							
January, 1884	.....	$3,000	$3,000	.....	$867,636	$867,636	$870,636
February, 1884	.....	6,000	6,000	.....	1,114,010	1,114,010	1,120,010
March, 1884	$6,372,362	3,000	6,375,362	.....	794,137	794,137	7,169,499
April, 1884	16,207,279	.....	16,207,279	$1,400	582,654	584,054	16,791,333
May, 1884	368,676	2,800	371,676	8,422	682,063	691,485	1,063,161
June, 1884	.....	2,240	2,240	655,606	.....	655,606	657,846
July, 1884	1,772	.....	1,772	.....	943,495	943,495	945,267
August, 1884	.....	2,750	2,750	.....	1,100,265	1,100,265	1,103,015
September, 1884	.....	1,300	1,300	.....	767,034	767,034	768,334
October, 1884	.....	3,800	3,800	.....	799,239	799,239	803,039
November, 1884	.....	6,500	6,500	.....	792,238	792,238	798,738
December, 1884	.....	12,300	12,300	982,400	1,359,339	1,741,739	1,754,039
Total	22,950,289	43,690	22,993,979	1,047,828	9,803,110	10,850,938	33,844,917
SAN FRANCISCO, CAL.							
January, 1884	.....	45,696	45,696	.....	680,275	680,275	725,971
February, 1884	.....	.....	.....	100,000	488,168	588,168	588,168
March, 1884	.....	.....	.....	50,550	237,310	287,860	287,860
April, 1884	.....	213	213	150,200	468,226	618,426	618,639
May, 1884	.....	1,549	1,549	345,000	160,800	505,800	507,349
June, 1884	.....	1,217	1,217	100,000	342,100	442,100	443,317
July, 1884	.....	3,855	3,855	90,000	785,881	875,881	879,736
August, 1884	.....	3,199	3,199	71,000	416,200	487,200	490,399
September, 1884	.....	720	720	194,000	515,621	709,621	710,341
October, 1884	.....	11,680	11,680	.....	550,173	550,173	561,853
November, 1884	.....	1,686	1,686	.....	452,700	452,700	454,386
December, 1884	.....	2,458	2,458	.....	865,555	865,555	868,013
Total	.....	72,273	72,273	1,100,750	5,963,009	7,063,759	7,136,032
ALL OTHER DISTRICTS.							
January, 1884	.....	.....	.....	.....	.....	.....	.....
February, 1884	.....	.....	.....	.....	.....	.....	.....
March, 1884	.....	.....	.....	.....	.....	.....	.....
April, 1884	.....	.....	.....	.....	.....	.....	.....
May, 1884	.....	.....	.....	.....	.....	.....	.....
June, 1884	.....	.....	.....	.....	.....	.....	.....
July, 1884	.....	.....	.....	.....	.....	.....	.....
August, 1884	.....	.....	.....	.....	.....	.....	.....
September, 1884	.....	.....	.....	.....	.....	.....	.....
October, 1884	.....	.....	.....	.....	.....	.....	.....
November, 1884	.....	.....	.....	.....	.....	.....	.....
December, 1884	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....
Total domestic exports	22,950,289	115,963	23,066,252	2,148,578	15,766,119	17,914,697	40,980,949

XIX.—*STATEMENT of IMPORTS and EXPORTS of GOLD and SILVER, &c.*—Continued.

EXPORTS (DOMESTIC).

Customs districts.	COIN.							Total gold and silver.
	Gold.			Silver.				
	American.	Foreign.	Total.	American.		Foreign.	Total.	
				Trade.	Other.			
NEW YORK, N. Y.								
January, 1884	$60, 895	.....	$60, 895	.....	.....	.....	.....	$60, 895
February, 1884	2, 263, 224	.....	2, 263, 224	.....	$3, 450	.....	$3, 450	2, 266, 674
March, 1884	4, 060, 303	.....	4, 060, 303	$25, 000	16, 017	.....	41, 017	4, 101, 320
April, 1884	3, 638, 632	.....	3, 638, 632	.....	.....	.....	.....	3, 638, 632
May, 1884	431, 900	.....	431, 900	.....	1, 000	.....	1, 000	432, 900
June, 1884	67, 000	.....	67, 000	.....	.....	.....	.....	67, 000
July, 1884	106, 531	.....	106, 531	51, 200	35, 000	.....	86, 200	192, 731
August, 1884	64, 254	.....	64, 254	157, 000	27, 302	.....	184, 302	248, 556
September, 1884	21, 480	.....	21, 480	70, 000	4, 892	.....	74, 892	96, 372
October, 1884	70, 530	.....	70, 530	.....	4, 711	.....	4, 711	75, 241
November, 1884	86, 983	.....	86, 983	100, 000	4, 500	.....	104, 500	191, 483
December, 1884	64, 501	.....	64, 501	.....	1, 000	.....	1, 000	65, 501
Total	10, 936, 233		10, 936, 233	403, 200	97, 872		501, 072	11, 437, 305
SAN FRANCISCO, CAL.								
January, 1884	12, 525	.....	12, 525	.....	350	.....	350	12, 875
February, 1884	35, 715	.....	35, 715	.....	.....	.....	.....	35, 715
March, 1884	24, 550	.....	24, 550	.....	.....	.....	.....	24, 550
April, 1884	23, 675	.....	23, 675	.....	.....	.....	.....	23, 675
May, 1884	47, 005	.....	47, 005	.....	.....	.....	.....	47, 005
June, 1884	15, 648	.....	15, 648	.....	.....	.....	.....	15, 648
July, 1884	41, 748	.....	41, 748	5, 200	.....	.....	5, 200	46, 948
August, 1884	25, 550	.....	25, 550	12, 350	.....	.....	12, 350	37, 900
September, 1884	53, 650	.....	53, 650	.....	1, 750	.....	1, 750	55, 400
October, 1884	103, 260	.....	103, 260	.....	.....	.....	.....	103, 260
November, 1884	43, 360	.....	43, 360	.....	.....	.....	.....	43, 360
December, 1884	139, 735	.....	139, 735	.....	.....	.....	.....	139, 735
Total	566, 421		566, 421	17, 550	2, 100		19, 650	586, 071
ALL OTHER DISTRICTS.								
January, 1884	.....	.....	.....	.....	448	.....	448	448
February, 1884	.....	.....	.....	.....	.....	.....	.....	.....
March, 1884	.....	.....	.....	.....	.....	.....	.....	.....
April, 1884	.....	.....	.....	.....	.....	.....	.....	.....
May, 1884	300, 000	.....	300, 000	.....	159	.....	159	300, 159
June, 1884	100	.....	100	.....	.....	.....	.....	100
July, 1884	200	.....	200	.....	1, 000	.....	1, 000	1, 200
August, 1884	75, 000	.....	75, 000	.....	.....	.....	.....	75, 000
September, 1884	200	.....	200	.....	100	.....	100	300
October, 1884	.....	.....	.....	.....	.....	.....	.....	.....
November, 1884	.....	.....	.....	.....	.....	.....	.....	.....
December, 1884	.....	.....	.....	.....	.....	.....	.....	.....
Total	375, 500		375, 500		1, 707		1, 707	377, 207
Total domestic exports.	11, 878, 154		11, 878, 154	420, 750	101, 679		522, 429	12, 400, 583

XIX.—*STATEMENT of IMPORTS and EXPORTS of GOLD and SILVER, &c.*—Continued.

EXPORTS (FOREIGN).

Ports.	BULLION.						Total gold and silver bullion.
	Gold.			Silver.			
	Bars.	Other bullion.	Total.	Bars.	Other bullion.	Total.	
NEW YORK, N. Y.							
January, 1884	$900	$1,500	$2,400	.....	.....	.....	$2,400
February, 1884	.....	.....	.....	.....	.....	.....	.....
March, 1884	.....	.....	.....	$6,700	.....	$6,700	6,700
April, 1884	.....	.....	.....	1,400	.....	1,400	1,400
May, 1884	.....	.....	.....	.....	.....	.....	.....
June, 1884	.....	.....	.....	11,600	.....	11,600	11,600
July, 1884	.....	.....	.....	7,300	.....	7,300	7,300
August, 1884	.....	.....	.....	500	.....	500	500
September, 1884	.....	.....	.....	37,920	.....	37,920	37,920
October, 1884	.....	.....	.....	.....	.....	.....	.....
November, 1884	.....	.....	.....	.....	.....	.....	.....
December, 1884	.....	.....	.....	.....	.....	.....	.....
Total	900	1,500	2,400	65,420	.....	65,420	67,820
SAN FRANCISCO, CAL.							
January, 1884	.....	.....	.....	.....	4,000	4,000	4,000
February, 1884	.....	.....	.....	.....	5,200	5,200	5,200
March, 1884	.....	.....	.....	.....	.....	.....	.....
April, 1884	.....	.....	.....	.....	.....	.....	.....
May, 1884	.....	.....	.....	.....	.....	.....	.....
June, 1884	.....	.....	.....	.....	.....	.....	.....
July, 1884	.....	.....	.....	.....	.....	.....	.....
August, 1884	.....	.....	.....	.....	.....	.....	.....
September, 1884	.....	.....	.....	.....	.....	.....	.....
October, 1884	.....	.....	.....	.....	.....	.....	.....
November, 1884	.....	.....	.....	.....	12,750	12,750	12,750
December, 1884	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	21,950	21,950	21,950
ALL OTHER PORTS.							
January, 1884	.....	.....	.....	.....	.....	.....	.....
February, 1884	.....	.....	.....	.....	.....	.....	.....
March, 1884	.....	.....	.....	.....	.....	.....	.....
April, 1884	.....	.....	.....	.....	.....	.....	.....
May, 1884	.....	.....	.....	.....	.....	.....	.....
June, 1884	.....	.....	.....	.....	.....	.....	.....
July, 1884	.....	.....	.....	.....	.....	.....	.....
August, 1884	.....	.....	.....	.....	.....	.....	.....
September, 1884	.....	.....	.....	.....	.....	.....	.....
October, 1884	.....	.....	.....	.....	.....	.....	.....
November, 1884	.....	.....	.....	.....	.....	.....	.....
December, 1884	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....
Total foreign exports (bullion).	900	1,500	2,400	65,420	21,950	87,370	89,770

XIX.—*STATEMENT of IMPORTS and EXPORTS of GOLD and SILVER, &c.*—Continued.

EXPORTS (FOREIGN).

Ports.	COIN.		Total gold and silver coin.
	Gold.	Silver.	
NEW YORK, N. Y.			
January, 1884	$5,000	$487,346	$492,346
February, 1884	1,106,218	324,600	1,430,818
March, 1884	1,763,920	359,256	2,123,176
April, 1884	1,176,926	229,268	1,406,194
May, 1884	1,559,734	249,700	1,809,434
June, 1884	44,900	241,897	286,797
July, 1884	5,000	207,320	212,320
August, 1884	4,866	326,818	331,684
September, 1884	.....	236,820	236,820
October, 1884	1,500	209,491	210,991
November, 1884	.....	291,814	291,814
December, 1884	1,563	222,614	224,177
Total	5,669,627	3,386,944	9,056,571
SAN FRANCISCO, CAL.			
January, 1884	24,250	264,652	288,902
February, 1884	.....	298,179	298,179
March, 1884	.....	568,696	568,696
April, 1884	.....	618,147	618,147
May, 1884	.....	530,348	530,348
June, 1884	.....	433,627	433,627
July, 1884	.....	734,262	734,262
August, 1884	.....	333,320	333,320
September, 1884	.....	1,501,905	1,501,905
October, 1884	1,763	1,005,038	1,006,801
November, 1884	.....	500,899	500,899
December, 1884	.....	1,020,868	1,020,868
Total	26,013	7,879,941	7,905,954
ALL OTHER PORTS.			
January, 1884	.....	9,688	9,688
February, 1884	.....	15,410	15,410
March, 1884	.....	17,137	17,137
April, 1884	800	.....	800
May, 1884	.....	2,482	2,482
June, 1884	.....	3,500	3,500
July, 1884	.....	.....	.....
August, 1884	.....	4,400	4,400
September, 1884	.....	.....	.....
October, 1884	.....	5,000	5,000
November, 1884	.....	.....	.....
December, 1884	.....	19,750	19,750
Total	800	77,367	78,167
Total foreign exports (coin)	5,696,440	11,344,252	17,040,692

XIX.—*STATEMENT of IMPORTS and EXPORTS of GOLD and SILVER COIN and BULLION for the calendar year ended December* 31, 1884.

IMPORTS.

	Gold.	Silver.	Total.
Bullion	$8, 747, 513	$3, 256, 938	$12, 004, 451
Foreign coin	14, 963, 011	11, 522, 689	26, 485, 700
Total	23, 710, 524	14, 779, 627	38, 490, 151
American coin	4, 247, 133	725, 150	4, 972, 283
Total bullion and coin	27, 957, 657	15, 504, 777	43, 462, 434

EXPORTS.

Domestic bullion	$23, 066, 252	$17, 914, 697	$40, 980, 949
Foreign bullion	2, 400	87, 370	89, 770
Foreign coin	5, 696, 440	11, 344, 252	17, 040, 692
Total	28, 775, 092	38, 028, 949	58, 111, 461
American coin	11, 878, 154	*522, 429	12, 400, 583
Total bullion and coin	40, 643, 246	38, 551, 378	70, 439, 794

*Includes 420,750 trade-dollars.

EXCESS.

Bullion and foreign coin:			
Exports, excess	$5, 064, 568	$23, 249, 322	$28, 313, 890
American coin:			
Imports, excess	.....	202, 721	.....
Exports, excess	7, 631, 021	.....	.....

XX.—*IMPORTS and EXPORTS of GOLD and SILVER BULLION* † *SAN FRANCISCO during calendar year* 1884.

IMPORTS.

Source.	Silver bullion.	Trade-dollars.	Silver coin.	Gold bullion.	Gold coin.	Total.
French Poss., all other	.....	.....	$34, 931	.....	$3, 800	$38, 731
British Columbia	.....	.....	.....	$654, 775	22, 671	677, 446
British Poss. in Australasia	.....	.....	.....	66, 002	394, 385	460, 387
Hawaiian Islands	.....	.....	467, 701	.....	85, 545	553, 246
Japan	.....	.....	11, 222	.....	645, 769	656, 991
Mexico	$1, 890, 222	.....	1, 513, 396	12, 641	23, 044	3, 439, 303
Peru	9, 200	.....	.....	.....	.....	9, 200
Central American States	.....	.....	25, 932	1, 800	1, 760	29, 492
China	.....	.....	4, 073	.....	.....	4, 073
Total	1, 899, 422	.....	2, 057, 255	735, 218	1, 176, 974	5, 868, 869

EXPORTS.

Source.	Domestic silver bullion.	Trade-dollars.	Silver coin.	Gold bullion.	Gold coin.	Foreign gold coin.	Total.
Hong-Kong	$4, 656, 953	$17, 550	*$7, 423, 093	$27, 273	$450, 788	.....	$12, 575, 657
Hawaiian Islands	.....	.....	†1, 006, 250	.....	145, 000	$24, 250	1, 175, 500
Mexico	.....	.....	.....	.....	4, 378	.....	4, 378
Japan	1, 144, 306	.....	445, 961	.....	1, 763	.....	1, 592, 030
French Poss., all other	.....	.....	10, 275	.....	.....	.....	10, 275
Central American States	.....	.....	.....	.....	.....	11, 255	11, 255
United States of Colombia	.....	.....	1, 750	.....	.....	.....	1, 750
East Indies	273, 500	.....	.....	.....	.....	.....	273, 500
Other islands and ports	.....	.....	5, 900	.....	.....	.....	5, 900
Total	6, 074, 759	17, 550	8, 893, 229	27, 273	613, 184	24, 250	15, 650, 245

*Mexican. †Hawaiian.

.—*COMPARISON of MONTHLY AVERAGE RATE of NEW YORK EXANGE on LONDON, with net IMPORT or EXPORT of GOLD from January* 1, 3, *to April*, 1885.

(Exports in bold-faced figures.)

	1878.		1879.		1880.		1881.	
mth.	Rate of exchange.	Net import or export.	Rate of exchange.	Net import or export.	Rate of exchange.	Net import or export.	Rate of exchange.	Net import or export.
y.....	485.0	$583,460	488.3	**$71,389**	485.0	$569,363	483.6	**$4,709,487**
ary.....	484.8	2,636,678	488.9	**21,843**	486.5	314,861	485.7	306,099
.....	488.2	**1,934,687**	489.5	111,515	488.5	**274,499**	483.2	7,008,988
.....	489.6	**2,860,196**	488.6	**255,41**	488.4	77,240	484.7	15,270,384
.....	488.3	316,597	489.3	**1 98,47**	489.4	17,083	487.1	701,279
.....	487.5	386,808	489.9	**1,329,722**	489.3	106,911	486.7	**294,393**
.....	487.0	23,382	487.7	**98,398**	486.1	182,444	486.1	638,491
t.....	488.5	**287,802**	484.5	6,372,649	484.5	9,054,481	484.5	5,248,548
ber.....	487.0	488,725	484.1	27,395,639	484.3	18,766,084	484.5	10,512,475
r.....	486.0	2,117,578	483.7	18,892,805	484.4	16,086,187	484.3	8,118,549
ber.....	487.0	**43,538**	483.8	17,317,835	483.4	9,334,632	485.1	2,962,678
ber.....	487.8	394,906	484.7	6,427,882	482.6	16,347,452	484.8	2,620,089
mean...	487.2	1,821,911	486.9	74,586,794	486.0	70,782,289	485.0	57,788,074

	1882.		1883.		1884.		1885.	
mth.	Rate of exchange.	Net import or export.	Rate of exchange.	Net import or export.	Rate of exchange.	Net import or export.	Rate of exchange.	Net import or export.
ry.....	487.0	$1,031,821	486.1	$1,275,639	487.3	**$371,647**	486.5	**$628,597**
ary.....	490.4	**6,762,568**	486.6	**454,704**	489.9	**2,988,853**	487.4	252,187
.....	490.0	**2,389,274**	484.3	2,960,679	490.4	**11,320,934**	486.9	923,515
.....	490.0	**1,784,848**	485.9	261,136	490.4	**18,037,096**	.....	.....
.....	494.7	**13,084,778**	487.6	**703,091**	488.4	**1,085,333**	.....	.....
.....	489.6	**5,315,109**	489.3	**198,903**	486.6	1,943,494	.....	.....
.....	488.9	**4,592,220**	488.2	328,884	485.5	2,123,997	.....	.....
t.....	489.7	**1,212,334**	487.2	1,845,031	485.1	2,882,681	.....	.....
ber.....	488.9	905,950	486.0	2,036,927	485.5	1,400,322	.....	.....
r.....	486.3	3,730,794	485.1	4,128,900	484.7	2,258,869	.....	.....
ber.....	485.0	2,189,062	485.4	3,960,450	485.0	8,054,375	.....	.....
ber.....	485.0	1,971,253	485.2	566,043	486.2	2,011,242	.....	.....
mean...	488.8	**25,375,551**	486.4	**16,006,991**	487.9	**12,385,589**	486.9	**1,804,249**

the period, 496.5—**$185,030,168.**

I.—*STATEMENT showing the DOMESTIC GOLD DEPOSITED, and EXCESS FOREIGN DEPOSITED over same imported, for the years* 1879 *to* 1884, *inclusive.*

scal years.	Domestic gold bullion deposited at the mints and assay offices.	Net import of foreign gold coin and bullion.	Foreign gold coin and bullion deposited at the mints and assay offices.	Excess of amount deposited at the mints as foreign gold coin and bullion over net exports of the same.
.....	$38,549,706	$1,527,560	$2,568,616	$1,041,056
.....	35,821,705	60,686,851	61,627,556	940,705
.....	35,815,086	91,715,012	93,133,858	1,418,846
.....	31,298,512	28,396,169	33,088,617	4,692,448
.....	32,481,642	6,941,905	11,633,227	4,691,322
.....	29,079,596	13,218,602	15,119,195	1,900,593
otal	203,046,197	202,486,099	217,171,069	14,684,970

XXIII.—*STATEMENT showing the IMPORTS and EXPORTS of GOLD COIN and BULLION for each year from* 1873 *to* 1884, *inclusive.*

COIN.

Fiscal years.	Imports of gold coin.	Exports of gold coin.	Excess of imports.	Excess of exports.
1873	$7,139,854	$36,046,540	.....	$28,906,68
1874	17,888,468	30,163,877	.....	12,275,40
1875	12,115,155	64,743,506	.....	52,628,35
1876	6,787,744	29,276,554	.....	22,488,81
1877	24,126,664	25,438,327	.....	1,311,66
1878	11,003,619	8,997,686	$2,005,933	.....
1879	4,327,704	4,556,585	.....	228,8
1880	60,420,951	3,447,755	56,973,196	.....
1881	69,032,340	2,478,032	66,554,308	.....
1882	24,971,001	30,987,444	.....	6,016,4
1883	14,399,441	7,482,433	6,917,008	.....
1884	17,833,746	18,027,374	.....	193,6
Total	270,046,687	261,646,113	132,450,445	124,049,8
Net	.....	.....	8,400,574	.....

BULLION.

Fiscal years.	Imports of gold bullion.	Exports of gold bullion.	Excess of imports.	Excess of exports.
1873	$1,542,593	$8,810,175	.....	$7,267,582
1874	1,614,669	3,878,543	.....	2,263,874
1875	1,581,638	2,237,471	.....	655,833
1876	1,204,965	1,900,496	.....	695,531
1877	2,119,570	1,152,047	$967,523	.....
1878	1,972,662	206,769	1,765,893	.....
1879	1,297,244	31,029	1,266,215	.....
1880	20,337,445	191,270	20,146,175	.....
1881	30,998,919	87,100	30,911,819	.....
1882	9,406,053	1,600,436	7,805,617	.....
1883	3,334,708	4,118,455	.....	783,747
1884	4,997,571	23,054,583	.....	18,057,012
Total	80,408,037	47,268,374	62,863,242	29,723,579
Net	.....	.....	33,139,663	.....

COIN AND BULLION.

Fiscal years.	Imports of gold coin and bullion.	Exports of gold coin and bullion.	Excess of imports.	Excess of exports.
1873	$8,682,447	$44,856,715	.....	$36,174,268
1874	19,503,137	34,042,420	.....	14,539,283
1875	13,696,793	66,980,977	.....	53,284,184
1876	7,992,709	31,177,050	.....	23,184,341
1877	26,246,414	26,590,374	.....	343,960
1878	12,976,281	9,204,455	$3,771,826	.....
1879	5,624,948	4,587,614	1,037,334	.....
1880	80,758,396	3,639,025	77,119,371	.....
1881	100,031,259	2,565,132	97,466,127	.....
1882	34,377,054	32,587,880	1,789,174	.....
1883	17,734,149	11,600,888	6,133,261	.....
1884	22,831,317	41,081,957	.....	18,250,640
Total	350,454,904	308,914,487	187,317,093	145,776,676
Net	.....	.....	41,540,417	.....

–STATEMENT of the GOLD COINAGE of the UNITED STATES MINTS and of UNITED STATES GOLD COIN REMELTED each year from 1873 to 1884.

Fiscal years.	Total gold coinage.	United States gold coin re-melted.	Net coinage.
.....	$35, 249, 337	$27, 116, 948	$8, 132, 389
.....	50, 442, 690	6, 275, 367	44, 167, 323
.....	33, 553, 965	1, 714, 312	31, 839, 653
.....	38, 178, 962	417, 947	37, 761, 015
.....	44, 078, 199	447, 340	43, 630, 859
.....	52, 798, 980	301, 022	52, 497, 958
.....	40, 986, 912	198, 083	40, 788, 829
.....	56, 157, 735	209, 329	55, 948, 406
.....	78, 733, 864	440, 777	78, 293, 087
.....	89, 413, 447	599, 357	88, 814, 090
.....	35, 936, 927	374, 129	35, 562, 798
.....	28, 932, 824	263, 117	27, 669, 707
.....	583, 463, 842	38, 357, 728	545, 106, 114

A.

STATEMENT showing the NET GOLD COINAGE from June 30, 1873, to July 1, 1879, and the GAIN by IMPORTS of GOLD COIN, and the ESTIMATED amount of GOLD COIN in the country at the latter date.

Year.	Gold coinage less coin deposited for re-coinage.	Net export or import of gold coin.	Gain or loss during the year.	Estimated amount of gold coin in the country at the close of the year.
73.....	.....	.....	.....	$135, 000, 000
74.....	$34, 853, 441	$7, 620, 695	*$27, 232, 746	162, 232, 746
75.....	30, 727, 862	52, 628, 351	†21, 900, 489	140, 332, 257
76.....	35, 649, 931	22, 488, 810	*13, 161, 121	153, 493, 378
77.....	41, 537, 598	1, 312, 268	*40, 225, 330	193, 718, 708
78.....	51, 181, 497	‡2, 367, 267	*53, 548, 764	247, 267, 472
1879.....	23, 494, 062	‡1, 796, 336	*25, 290, 398	273, 000, 000

* Gain. † Loss. ‡ Net import.

B.

STATEMENT of NET COINAGE, IMPORT, and GAIN in UNITED STATES GOLD COIN from January 1, 1879, to January 1, 1885.

	Net gold coinage.	Net imports of United States gold coin.	Total.	United States gold coin used in arts in excess of amount brought in by immigrants.	Net gain.	Total in the country.
..	.....	.....	.....	.....	.....	$273, 000, 000
..	$38, 374, 788 14	$13, 727, 586	$52, 602, 374 14	.....	$52, 602, 374 14	326, 000, 000
..	61, 938, 180 76	6, 637, 664	68, 575, 844 76	.....	68, 575, 844 76	394, 000, 000
..	96, 331, 786 18	2, 452, 199	98, 783, 985 18	$3, 000, 000	95, 783, 985 18	489, 000, 000
..	65, 478, 536 09	*25, 796, 504	39, 682, 032 09	3, 500, 000	36, 182, 032 09	525, 000, 000
..	28, 866, 485 00	3, 309, 811	32, 176, 296 00	4, 000, 000	28, 176, 296 00	554, 000, 000
..	23, 724, 879 05	*8, 417, 059	15, 307, 820 05	4, 500, 000	10, 807, 820 05	563, 000, 000

* Net exports.

XXVI.—*DOMESTIC GOLD DEPOSITED at the MINTS and ASSAY OFF and ESTIMATED GOLD PRODUCTION of the UNITED STATES, for the* 1870 *to* 1884, *inclusive.*

Years.	Domestic deposited at the mints and assay offices.	Estimates of annual production— By Mr. Burchard (fiscal years to 1879).		By Messrs. Raymond and Linderman (calendar years).	By M entin endar
		Production.	Excess (domestic not deposited).		
1870	$19,612,786	.....	.....	$50,000,000	$33,
1871	26,085,389	.....	.....	43,500,000	34,
1872	28,445,548	.....	.....	36,000,000	38,
1873	28,868,570	.....	.....	36,000,000	39,
1874	29,736,388	$33,500,000	$3,763,612	40,000,000	38,
1875	34,266,125	33,400,000	*866,125	40,000,000	39,
1876	37,590,529	39,900,000	2,309,471	46,750,000	42,
1877	43,478,104	46,900,000	3,421,896	45,100,000	44,
1878	48,075,124	51,200,000	3,124,876	50,226,107	37,
1879	38,549,706	38,900,000	350,294	.....	31,
1880	35,372,453	36,000,000	627,547	.....	32,
1880†	20,255,267	25,000,000	244,273	.....	.....
1881	‡34,871,859	34,700,000	*171,859	.....	30,
1882	‡31,378,248	32,500,000	1,121,752	.....	29,
1883	‡30,013,366	30,000,000	*13,366	.....	27,
1884	‡30,807,200	30,800,000	*7,200	.....	25,

* Deficiency. † One-half calendar year. ‡ Calendar year.

XXVII.—*COMPARISON of ESTIMATES of the PRODUCTION of GOLD and VER in the UNITED STATES for the years* 1870 *to* 1884.

Years.	Mr. Burchard. †	Messrs. Raymond and Linderman (calendar years).	Mr. Vale (calend years
1870	.....	$66,000,000	$51,
1871	.....	66,663,000	53,
1872	.....	68,943,857	58,
1873	.....	71,642,523	66,
1874	$70,815,496	72,428,206	68,
1875	65,195,416	74,817,596	71,
1876	78,712,182	85,250,000	83,
1877	86,690,963	84,050,000	99,
1878	96,487,745	93,952,421	74,
1879	79,711,900	.....	68,
1880*	75,200,000	.....	70,
1881*	77,700,000	.....	78,
1882*	79,300,000	.....	77,
1883*	76,200,000	.....	70,
1884*	79,600,000	.....	68,

* Calendar year. † Silver dollar coining rate.

[VIII.—*PRODUCTION of GOLD and SILVER in the UNITED STATES, annually, from* 1845 *to* 1884, *estimated by R. W. Raymond from* 1845 *to* 1873, *inclusive, and by the Director of the Mint since.*

ars.	Estimated product.			Years.	Estimated product.		
	Gold.	Silver.	Total.		Gold.	Silver.	Total.
.....	$1,008,327	.....	$1,008,327	1866.....	$53,500,000	$10,000,000	$63,500,000
.....	1,139,357	.....	1,139,357	1867.....	51,725,000	13,500,000	65,225,000
.....	889,085	.....	889,085	1868.....	48,000,000	12,000,000	60,000,000
.....	10,000,000	.....	10,000,000	1869.....	49,500,000	12,000,000	61,500,000
.....	40,000,000	$50,000	40,050,000	1870.....	50,000,000	16,000,000	66,000,000
.....	50,000,000	50,000	50,050,000	1871.....	43,500,000	23,000,000	66,500,000
.....	55,000,000	50,000	55,050,000	1872	36,000,000	28,750,000	64,750,000
.....	60,000,000	50,000	60,050,000	1873.....	36,000,000	35,750,000	71,750,000
.....	65,000,000	50,000	65,050,000	1874.....	33,500,000	37,300,000	70,800,000
.....	60,000,000	50,000	60,050,000	1875 ...	33,400,000	31,700,000	65,100,000
.....	55,000,000	50,000	55,050,000	1876.....	39,900,000	38,800,000	78,700,000
.....	55,000,000	50,000	55,050,000	1877.....	46,900,000	39,800,000	86,700,000
.....	55,000,000	50,000	55,050,000	1878.....	51,200,000	45,200,000	96,400,000
.....	50,000,000	500,000	50,500,000	1879.....	38,900,000	40,800,000	79,700,000
.....	50,000,000	100,000	50,100,000	1880*....	36,000,000	39,200,000	75,200,000
.....	46,000,000	150,000	46,150,000	1881*....	34,700,000	43,000,000	77,700,000
.....	43,000,000	2,000,000	45,000,000	1882*....	32,500,000	46,800,000	79,300,000
.....	39,200,000	4,500,000	43,700,600	1883*....	30,000,000	46,200,000	76,200,000
.....	40,000,000	8,500,000	48,500,000	1884*....	30,800,000	48,800,000	79,600,000
.....	46,100,000	11,000,000	57,100,000				
.....	53,225,000	11,250,000	64,475,000	Total..	1,651,586,769	647,050,000	2,298,636,769

* Calendar year.

IX.—*STATEMENT showing the COIN and PAPER MONEY in CIRCULATION the UNITED STATES (outside of the Treasury) at the commencement of each of the calendar years* 1873–1885, *inclusive, and the per capita circulation.*

Periods.	Estimated population.	Circulation.			Per capita.		
		Coin outside of Treasury.	Paper money outside of Treasury.	Total coin and paper outside of Treasury.	Coin.	Paper.	Total.
ary 1, 1873...	41,700,000	$†75,000,000	$712,803,291	$787,803,291	1.80	17.10	18.90
ary 1, 1874 ..	42,800,000	†71,500,000	723,521,376	795,021,376	1.67	16.90	18.57
ary 1, 1875...	44,000,000	†94,000,000	705,540,188	799,540,188	2.13	16.04	18.17
ary 1, 1876...	45,200,000	†111,500,000	685,993,490	797,493,490	2.46	15.18	17.64
ary 1, 1877..	46,400,000	†137,000,000	696,559,433	833,559,433	2.95	15.01	17.96
ary 1, 1878...	47,600,000	171,000,000	624,697,129	795,697,129	3.59	13.12	16.71
ary 1, 1879...	48,900,000	225,000,000	614,023,663	839,023,663	4.60	12.55	17.15
ary 1, 1880...	*50,100,000	307,000,000	677,400,804	984,400,804	6.13	13.52	19.65
ary 1, 1881...	50,900,000	418,000,000	713,707,664	1,131,707,664	8.01	14.02	22.03
ary 1, 1882...	52,600,000	493,000,000	744,935,953	1,237,935,953	9.37	14.16	23.53
ary 1, 1883...	54,400,000	497,000,000	782,304,240	1,279,304,240	9.14	14.36	23.50
ary 1, 1884...	56,100,000	496,000,000	808,866,637	1,304,866,637	8.84	14.42	23.26
ary 1, 1885...	57,700,000	481,000,000	837,163,401	1,318,163,401	8.33	14.15	22.48

* Census, June 1. † Estimated from mean of fiscal year.

XXX.—*WORLD'S PRODUCTION of GOLD and SILVER.*

Countries.	1881.				1882.				1883.			
	Gold.		Silver.		Gold.		Silver.		Gold.		Silver.	
	Kilos.	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*	*Kilos.*	*Dollars.*
United States	52, 212	34, 700, 000	1, 034, 649	43, 000, 000	48, 902	32, 500, 000	1, 126, 083	46, 800, 000	45, 140	30, 000, 000	1, 111, 457	46, 200, 000
Russia	36, 671	24, 371, 343	7, 992	332, 198	35, 913	23, 867, 935	7, 781	323, 427	*35, 913	23, 867, 935	*7, 781	323, 427
Australia	†46, 178	30, 690, 000	‡3, 970	164, 983	43, 550	28, 943, 217	2, 475	102, 878	†39, 873	26, 500, 000	§1, 924	80, 000
Mexico	‖1, 292	858, 909	‖665, 918	27, 675, 540	1, 469	936, 223	703, 508	29, 237, 798	1, 438	955, 639	711, 347	29, 568, 576
Germany	¶350	232, 610	*a*186, 990	7, 771, 804	376	249, 890	214, 982	8, 934, 652	457	303, 722	230, 694	9, 589, 300
Austria-Hungary	1, 867	1, 240, 808	31, 359	1, 303, 280	*b*1, 580	1, 050, 068	*b*47, 118	1, 958, 224	1, 638	1, 088, 615	48, 708	2, 024, 645
Sweden	1	665	1, 176	48, 875	17	11, 298	1, 500	62, 350	37	24, 590	1, 583	65, 800
Norway	.....	.....	4, 812	199, 987	.....	.....	5, 893	244, 954	.....	.....	5, 645	234, 645
Italy	*d*109	72, 375	*d*432	17, 949	*d*109	72, 375	*d*432	17, 949	*d*109	72, 375	*d*432	17, 949
Spain	.....	.....	*e*74, 500	3, 096, 220	.....	.....	*e*74, 500	3, 096, 220	.....	.....	*e*74, 500	3, 096, 220
Turkey	7	4, 918	1, 719	71, 441	10	6, 646	2, 164	89, 916	*10	6, 646	*2, 164	*89, 916
Argentine Republic	*f*118	78, 546	*f*10, 109	420, 225	*f*118	78, 546	*f*10, 109	420, 225	*f*118	78, 546	*f*10, 109	420, 225
Colombia	*f*6, 019	4, 000, 000	*f*24, 057	1, 000, 000	5, 802	3, 856, 000	18, 283	760, 000	*5, 802	3, 856, 000	*18, 283	760, 000
Bolivia	109	72, 375	264, 677	11, 000, 000	*g*109	72, 375	*g*264, 677	11, 000, 000	*g*109	72, 375	384, 923	16, 000, 000
Chili	194	128, 869	122, 275	5, 081, 747	245	163, 000	128, 106	5, 325, 000	*245	163, 000	*128, 106	5, 325, 000
Brazil	1, 116	741, 694	.....	.....	*g*1, 116	741, 694	.....	.....	952	632, 520	.....	.....
Japan	*f*702	466, 548	*f*22, 046	916, 400	*f*702	466, 548	*f*22, 046	916, 400	181	120, 080	8, 488	353, 825
Africa	*a*3, 000	1, 993, 800	.....	.....	*a*3, 000	1, 993, 800	.....	.....	*a*3, 000	1, 993, 800	.....	.....
Venezuela	*a*3, 423	2, 274, 692	.....	.....	3, 904	2, 595, 077	.....	.....	*c*5, 022	3, 338, 058	.....	.....
Dominion of Canada	1, 648	1, 094, 926	1, 641	68, 205	*g*1, 648	1, 094, 926	*g*1, 641	68, 205	1, 435	954, 000	*g*1, 641	68, 205
France	.....	.....	.....	.....	.....	.....	14, 291	594, 053	.....	.....	.....	.....
Total	155, 016	103, 023, 078	2, 458, 322	102, 168, 354	148, 510	98, 699, 588	2, 645, 589	105, 952, 251	141, 479	94, 027, 901	2, 747, 785	114, 217, 733

* Estimated same as official statement for 1882.
† Official for Victoria and New South Wales, with estimated production of the other provinces.
‡ The mean of the official production for 1880 and 1882.
§ Amount parted from deposits at the Sydney and Melbourne mints.
‖ Coinage and export.
¶ Estimated same as official statement 1880.

a Estimated by Dr. A. Soetbeer.
b Official for Hungary, with former annual official production for Austria added.
c Report of Consul Dalton, Consular Reports for May, 1884, page 394.
d Estimated same as official statement for 1877.
e Estimated same as official statement for 1880.
f Estimated same as official statement for 1879.
g Estimated same as official statement for 1881.

Countries.	1881.		1882.		1883.	
	Gold.	Silver.	Gold.	Silver.	Gold.	Silver.
United States	$96, 850, 800	$27, 939, 263	$65, 887, 685	$27, 972, 085	$29, 241, 990	$29. 245, 989
Mexico	438, 778	24, 139, 023	452, 500	25, 146, 260	*407, 600	*24, 083, 921
Bolivia		1, 970, 983		1, 684, 865		†1, 600, 000
Argentine Republic					4, 530, 210	1, 715, 445
Hayti		780, 000				
Great Britain		4, 852, 523		1, 021, 881	6, 881, 169	6, 201, 517
Australia	19, 699, 115		18, 701, 959		15, 903, 722	
India		20, 682, 625	170, 543	29, 386, 322	*67, 044	24, 927, 400
Germany	1, 634, 189		3, 167, 085	6. 407, 157	21, 002, 897	594, 464
Austria-Hungary	2, 429, 998	9, 028, 671	2, 829, 590	3, 122, 819	2, 154, 390	5, 552, 191
France	418, 231	1, 299, 554	722, 206	223, 853		
Belgium		38, 055	2, 016, 117			
Italy	3, 253, 988	1, 596, 346			785, 027	
Netherlands				608, 312		81, 095
Norway		28, 930		69, 660	192, 708	87, 520
Sweden	340, 275	290, 137	39, 876	17, 707	436, 619	250, 468
Spain	21, 067, 127	3, 080, 198	1, 996, 310	10, 671, 842	3, 327, 235	10, 523, 421
Portugal	245, 160		162, 000		217, 080	
Japan	490, 585	4, 514, 043	803, 645	3, 294, 968	964, 533	7, 584, 188
Brazil	21, 659				52, 801	23, 589
Roumania		4, 747, 800				
Russia					12, 793, 575	
Turkey			2, 960, 056		1, 344, 640	44, 000
Chili	125, 280	3, 020, 000				
Colombia						699, 114
Switzerland					965, 000	
Honduras				76, 314		
Persia					47, 117	605, 579
Total	147, 015, 275	108, 010, 086	99, 909, 662	109, 703, 535	101, 265, 357	113, 769, 901

*Fiscal year. †Approximate.

XXXII.—*CIRCULATION.*

Countries.	Population.		Date for which circulation is stated.	Paper.	Specie.				Total paper currency and specie.	Per capita.	
	Year.	Latest.			Gold.	Silver, full legal tender.	Silver limited tender.	Total.		Paper.	Specie.
United States	1880	50, 155, 783	Oct. 1, 1883	$873, 426, 755	$610, 500, 000	$187, 000, 000	$75, 000, 000	$872, 500, 000	$1, 745, 926, 755	$17. 41	$19. 39
Great Britain and Ireland	1881	35, 246, 562	July 26, 1884	*197, 818, 139	†583, 500, 000	.....	95, 000, 000	678, 500, 000	876, 318, 139	5. 61	19. 25
Dominion of Canada, including Manitoba and Newfoundland	1881	4, 506, 563	June 30, 1884	†45, 770, 084	§9, 326, 000	.....	§4, 500, 000	13, 826, 000	59, 596, 084	10. 15	3. 07
British India	1881	252, 541, 210	Dec. 31, 1883	§62, 383, 126	.....	‖1, 037, 000, 000	.....	1, 037, 000, 000	1, 099, 383, 126	. 24	4. 10
Ceylon	1881	2, 758, 166	Dec. 31, 1883	§1, 563, 300	.....	§772, 000	.....	772, 000	2, 335, 300	. 57	. 28
Australia, Tasmania, and New Zealand	1881	2, 798, 898	Dec. 31, 1883	§26, 010, 722	§65, 000, 000	.....	§5, 000, 000	70, 000, 000	96, 010, 722	9. 03	25. 01
Cape of Good Hope	1880	780, 757	Dec. 31, 1883	§5, 637, 000	§30, 000, 000	.....	§2, 441, 000	32, 441, 000	38, 078, 000	7. 22	41. 54
France	1881	37, 672, 048	Sept. 18, 1884	**548, 061, 912	†848, 000, 000	†537, 000, 000	57, 900, 000	1, 442, 900, 000	1, 990, 961, 912	14. 55	38. 30
Algiers	1877	2, 867, 626	Dec. 31, 1883	§12, 352, 000	§9, 300, 000	§5, 915, 000	.....	15, 215, 000	27, 567, 000	4. 30	5. 30
Guadeloupe	1878	185, 460	Dec. 31, 1883	965, 750	381, 000	281, 000	.....	662, 000	1, 627, 750	5. 21	23. 52
Belgium	1881	5, 585, 846	Sept. 11, 1884	**62, 826, 515	†64, 000, 000	†53, 000, 000	6, 500, 000	123, 500, 000	186, 326, 515	12. 11	11. 81
Switzerland	1880	2, 846, 102	Sept. 6, 1884	**21, 480, 731	†17, 000, 000	†10, 000, 000	4, 700, 000	31, 700, 000	53, 180, 731	7. 55	7. 14
Italy	1881	28, 452, 639	June 30, 1884	a321, 548, 521	b140, 000, 000	b38, 000, 000	b34, 000, 000	212, 000, 000	533, 548, 521	11. 30	2. 45
Greece	1882	1, 979, 423	Dec. 31, 1883	§23, 739, 000	§2, 702, 000	§2, 702, 000	.....	5, 404, 000	29, 143, 000	12. 00	12. 73
Spain	1877	16, 625, 860	Aug. 30, 1884	c70, 812, 440	130, 000, 000	40, 000, 000	30, 000, 000	200, 000, 000	270, 812, 440	4. 32	22. 02
Cuba	1877	1, 394, 516	Dec. 31, 1883	§44, 862, 543	§28, 181, 000	.....	.....	28, 181, 000	73, 043, 543	32. 17	. 07
Luzon	1880	4, 450, 191	Dec. 31, 1883	§1, 200, 000	§762, 000	§2, 236, 000	.....	2, 998, 000	4, 198, 000	. 27	. 67
Portugal, including Azores and Madeira	1878	4, 550, 699	Dec. 31, 1883	6, 367, 680	§30, 000, 000	.....	§10, 000, 000	40, 000, 000	46, 367, 680	1. 40	8. 79
Germany	1880	45, 235, 061	Dec. 31, 1883	279, 573, 023	†334, 420, 000	109, 480, 000	†102, 000, 000	545, 900, 000	825, 473, 023	6. 18	12. 06
Austria-Hungary	1880	35, 839, 428	Sept. 15, 1884	**311, 646, 314	†45, 000, 000	†75, 000, 000	.....	120, 000, 000	431, 646, 314	8. 69	3. 35
Sweden and Norway	1880	6, 479, 168	Dec. 31, 1883	23, 623, 292	14, 296, 783	.....	5, 138, 368	19, 435, 151	43, 058, 443	3. 65	3. 00
Danish Kingdom	1880	2, 096, 400	Dec. 31, 1883	20, 334, 000	13, 936, 000	.....	4, 958, 000	18, 894, 000	39, 228, 000	9. 70	9. 00
Netherlands	1883	4, 172, 921	Sept. 13, 1884	**78, 847, 949	†28, 000, 000	†57, 000, 000	.....	85, 000, 000	163, 847, 949	14. 10	20. 37
Russia	1880	98, 323, 000	Aug. 13, 1884	a522, 423, 641	d124, 008, 153	.....	.....	124, 008, 153	646, 431, 794	5. 31	1. 26
Turkey	1880	24, 987, 000	Dec. 31, 1883	8, 515, 976	39, 600, 000	35, 200, 000	.....	74, 800, 000	83, 315, 976	. 34	3. 00
Roumania	1881	5, 376, 000	Dec. 31, 1883	§15, 822, 383	§163, 000	§11, 387, 000	.....	11, 550, 000	27, 372, 383	2. 94	2. 15
Mexico	1880	9, 787, 629	June 30, 1883	e2, 048, 529	d10, 000, 000	§40, 000, 000	.....	50, 000, 000	52, 048, 529	. 21	5. 23
Central America	1881	2, 891, 600	Dec. 31, 1883	§2, 009, 861	§2, 318, 000	§374, 000	.....	2, 692, 000	4, 701, 861	. 06	. 93
Argentine Republic	1880	2, 540, 000	Dec. 31, 1883	50, 651, 850	f10, 000, 000	g9, 000, 000	g1, 720, 000	20, 720, 000	71, 371, 850	19. 94	8. 15
Colombia	1881	3, 000, 000	Dec. 31, 1883	1, 097, 830	.....	.....	4, 000, 000	4, 000, 000	5, 097, 830	0. 36	1. 33
Brazil	1882	11, 831, 326	Dec. 31, 1883	189, 871, 255	.....	.....	.....	.....	189, 871, 255	11. 82	.....
Peru											

[illegible]	1883	[illegible]	Dec. 31, 1883		54, 000, 000	$780, 000		4, 780, 000	4, 780, 000		8. 26
		36, 700, 110	Dec. 31, 1883	112, 411, 093	92, 000, 000	44, 333, 712		136, 333, 712	248, 744, 805	3. 06	3. 71
Hawaiian Islands	1882	66, 895	Dec. 31, 1883	325, 000	549, 900		950, 000	1, 499, 900	1, 834, 900	5. 01	22. 41
Total				3, 943, 746, 608	3, 293, 696, 836	2, 310, 680, 712	443, 930, 368	6, 048, 217, 916	9, 991, 964, 524		

* London Bankers' Magazine for September, 1884.
† Estimate of last year, with net imports added, deducting consumption.
‡ New York Chronicle, August 2, 1884.
§ Estimate in last report.
‖ Estimate of last year, adding coinage and deducting consumption.

** London Economist, September 20, 1884.
a London Economist, August 30, 1884.
b "Wahrung's Politik," 1884, by Ottomar Haupt.
c London Economist, September 13, 1884.
d Bank reserve only.
e London Economist, September 15, 1883.

f New coinage, $6,000,000; foreign gold estimated, $4,000,000.
g Estimated from total specie circulation reported by United States minister.

XXXIII.—*TABLE of GOVERNMENT and BANK ISSUE and METALLIC RESERVES.*

Countries.	Date referred to.	Paper.			Bullion and coin in —						Aggregate.
					Treasury.			Banks.			
		Government issue.	Bank issue.	Total.	Gold.	Silver.	Total.	Gold.	Silver.	Total.	
United States	Oct. 1, 1884	*$537, 597, 527	$335, 829, 228	$873, 426, 755	$217, 904, 042	$176, 467, 351	$394, 371, 393	$127, 682, 848	$11, 978, 833	$139, 661, 681	$534, 033, 074
Great Britain and Ireland.	July 26, 1884	.....	†197, 818, 139	197, 818, 139	.....	.....	.....	.....	.....	†154, 182, 691	154, 182, 691
Dominion of Canada, including Manitoba and Newfoundland.	June 30, 1884	‡16, 115, 084	‡29, 655, 000	45, 770, 084	‡2, 471, 148	.....	2, 471, 148	.....	.....	‡6, 640, 000	9, 111, 148
British India	Dec. 31, 1883	§62, 383, 126	.....	62, 383, 126	.....	§70, 638, 000	70, 638, 000	.....	§7, 720, 000	7, 720, 000	78, 358, 000
Ceylon	Dec. 31, 1883	.....	§1, 563, 300	1, 563, 300	.....	.....	.....	.....	§1, 273, 800	1, 273, 800	1, 273, 800
Australia, Tasmania, and New Zealand.	Dec. 31, 1883	.....	§26, 010, 722	26, 010, 722	.....	.....	.....	§48, 737, 837	.....	48, 737, 837	48, 737, 837
Cape of Good Hope	Dec. 31, 1883	.....	§5, 637, 000	5, 637, 000	.....	.....	.....	§8, 092, 000	.....	28, 092, 000	8, 092, 000
France	Sept. 18, 1884	.....	‖543, 061, 912	543, 061, 912	.....	.....	.....	‖204, 650, 036	‖198, 289, 718	404, 939, 754	402, 939, 754
Algiers	Dec. 31, 1883	.....	§12, 352, 000	12, 352, 000	§35, 798	§124, 678	160, 476	§3, 474, 000	§1, 930, 000	5, 404, 000	5, 564, 476
Guadeloupe	Dec. 31, 1883	.....	§965, 750	965, 750	§50, 608	§134, 113	184, 721	§329, 914	§50, 300	380, 214	564, 935
Belgium	Sept. 11, 1884	.....	‖62, 826, 515	62, 826, 515	.....	.....	.....	.....	.....	‖17, 991, 450	17, 991, 450
Switzerland	Sept. 6, 1884	.....	‖21, 480, 731	21, 480, 731	77, 586	47, 092	124, 678	.....	.....	‖11, 484, 940	11, 609, 618
Italy	Dec. 31, 1883 / June 30, 1884	157, 674, 000	¶163, 874, 521	321, 548, 521	.....	.....	.....	.....	.....	¶69, 357, 358	69 357, 358
Greece	Dec. 31, 1883	.....	§23, 739, 000	23, 739, 000	.....	.....	.....	.....	.....	§1, 800, 000	1, 800, 000
Spain	Aug. 30, 1884	.....	**70, 812, 440	70, 812, 440	314, 719	1, 627, 723	1, 942, 492	.....	.....	**25, 281, 467	27, 223, 959
Cuba	Dec. 31, 1883	.....	§44, 862, 543	44, 862, 543	§3, 141, 215	.....	§3, 141, 215	§11, 040, 028	.....	11, 040, 028	14, 181, 243
Luzon	Dec. 31, 1883	.....	§1, 200, 000	1, 200, 000	§1, 237, 401	§2, 528, 276	3, 765, 677	.....	.....	.....	3, 765, 677
Portugal, including Azores and Madeira.	Dec. 31, 1883	.....	6, 367, 680	6, 367, 680	.....	.....	.....	11, 718, 874	.....	11, 718, 874	11, 718, 874
Germany	Dec. 31, 1883	34, 473, 245	245, 099, 778	279, 573, 023	28, 560, 000	.....	28, 560, 000	153, 146, 674	.....	153, 146, 674	181, 706, 674
Austria-Hungary	Dec. 31, 1883 / Sept. 15, 1884	139, 678, 804	‖171, 967, 510	311, 646, 314	929, 178	3, 799, 492	4, 728, 670	‖31, 213, 731	‖62, 189, 000	93, 402, 731	98, 131, 401
Sweden and Norway	Dec. 31, 1883	.....	23, 623, 292	23, 623, 292	157, 088	173, 308	330, 396	11, 533, 663	876, 916	12, 410, 579	12, 740, 975
Danish Kingdom	Dec. 31, 1883	.....	20, 234, 000	20, 234, 000	.....	.....	.....	13, 132, 000	938, 000	14, 070, 000	14, 070, 000
Netherlands	Sept. 13, 1884 / Dec. 29, 1883	3, 787, 053	‖75, 060, 896	78, 847, 949	.....	.....	.....	‖17, 213, 810	‖37, 900, 302	55, 114, 112	55, 114, 112
Russia	Aug. 13, 1884	.....	¶522, 423, 641	522, 423, 641	.....	.....	.....	¶124, 008, 153	.....	124, 008, 153	124, 008, 153
Turkey	Dec. 31, 1883	7, 150, 876	1, 365, 100	8, 515, 976	.....	.....	.....	3, 520, 000	11, 000, 000	14, 520, 000	14, 520, 000
Roumania	Dec. 31, 1883	§2, 333, 704	§13, 488, 679	15, 822, 383	§31, 149	§55, 243	86, 392	§132, 276	§3, 776, 630	3, 908, 906	3, 995, 298
Mexico	Dec. 31, 1883	.....	§2, 058, 229	2, 058, 229	.....	.....	.....	.....	.....	§1, 763, 008	1, 763, 008
Central America	Dec. 31, 1883	1, 589, 861	420, 000	2, 009, 861	.....	.....	.....	.....	.....	.....	.....
Argentine Republic	Dec. 31, 1883	.....	50, 651, 350	50, 651, 350	.....	.....	.....	.....	.....	.....	.....
										14, 196, 461	14, 196, 461

Colombia	Dec. 31, 1883	.....	§1, 097, 820	1, 097, 820	.....	.....	.....	.....	.....	.....	.....
Brazil	Dec. 31, 1883	128, 028, 897	11, 842, 357	139, 871, 254	.....	.....	.....	§62, 085	§1, 819, 933	1, 882, 018	1, 882, 018
Peru	Dec. 31, 1883	§13, 098 820	.....	13, 098, 820	.....	.....	.....	.....	.....	.....	.....
Venezuela	Dec. 31, 1883	.....	559, 700	559, 700	.....	.....	.....	.....	.....	.....	.....
Chili	Dec. 31, 1883	.....	§26, 555, 341	26, 555, 341	.....	.....	§798, 000	.....	.....	§1, 600, 000	2, 398, 000
Bolivia	Dec. 31, 1883	.....	1, 508, 533	1, 508, 533	.....	.....	.....	.....	§443, 597	443, 597	443, 597
Uruguay	Dec. 31, 1883	§2, 086, 000	§3, 900, 000	5, 986, 000	.....	.....	.....	§4, 601, 000	.....	4, 601, 000	4, 601, 000
Japan	Dec. 31, 1883	85, 161, 371	27, 249, 722	112, 411, 093	8, 040, 751	14, 629, 178	22, 660, 929	512, 261	5, 304, 783	5, 817, 044	28, 486, 973
Hawaiian Islands	Dec. 31, 1883	.....	335, 000	335, 000	263, 450	436, 000	699, 450	95, 250	13, 500	108, 750	808, 200
Total	.....	1, 191, 158, 368	2, 752, 498, 039	3, 943, 656, 407	263, 214, 133	270, 660, 504	534, 672, 637	774, 896, 440	345, 705, 312	1, 424, 899, 127	1, 959, 571, 764

*Not including gold and silver certificates in the Treasury, $60,316,430.
§Same as last report.
**London Economist, September 13, 1884.
†London Bankers' Magazine, September, 1884.
‖London Economist, September 20, 1884.
‡New York Chronicle, August 2, 1884.
¶London Economist, August 30, 1884.

XXXIV.—*TABLE showing the TOTAL PAPER and SPECIE CIRCULATION each of the PRINCIPAL COUNTRIES of the WORLD, the amount of SPECIE BANK and NATIONAL TREASURIES, and the AMOUNT of ACTIVE CIRCULATION.*

Countries.	Population.	Total metallic and paper circulation.	Amount of specie in banks and national treasuries.	Active circulation.	Per capita of active circulation.
United States	50, 155, 783	$1, 745, 926, 755	$534, 033, 074	$1, 211, 893, 681	$24.16
Great Britain and Ireland	35, 246, 562	876, 318, 139	154, 182, 691	722, 135, 448	20.49
Dominion of Canada, including Manitoba and Newfoundland	4, 506, 563	59, 596, 084	9, 111, 148	50, 484, 936	11.22
British India	252, 541, 210	1, 099, 383, 126	78, 358, 000	1, 021, 025, 126	4.05
Ceylon	2, 758, 166	2, 335, 300	1, 273, 800	1, 061, 500	.38
Australia, Tasmania, and New Zealand	2, 798, 898	96, 010, 722	48, 737, 837	47, 272, 885	16.90
Cape of Good Hope	780, 757	38, 078, 000	8, 092, 000	29, 986, 000	38.40
France	37, 321, 186	1, 990, 961, 912	402, 939, 754	1, 588, 022, 158	42.55
Algiers	2, 867, 626	27, 567, 000	5, 564, 476	22, 002, 524	7.67
Guadeloupe	185, 469	1, 627, 750	564, 935	1, 062, 815	5.73
Belgium	5, 536, 654	186, 326, 515	17, 991, 450	168, 335, 065	30.40
Switzerland	2, 846, 102	53, 180, 731	11, 609, 618	41, 571, 113	14.60
Italy	28, 452, 639	533, 548, 521	69, 357, 358	464, 191, 163	16.31
Greece	1, 979, 423	29, 143, 000	1, 800, 000	27, 343, 000	13.81
Spain	16, 625, 860	270, 812, 440	27, 223, 959	243, 588, 481	14.65
Cuba	1, 394, 516	73, 043, 543	14, 181, 243	58, 862, 300	42.21
Luzon	4, 450, 191	4, 198, 000	3, 765, 677	432, 323	.10
Portugal, including Azores and Madeira	4, 550, 699	46, 367, 680	11, 718, 874	34, 648, 806	7.61
Germany	45, 234, 061	825, 473, 023	181, 706, 674	643, 766, 349	14.23
Austria-Hungary	35, 839, 428	431, 646, 314	98, 131, 401	333, 514, 913	9.31
Sweden and Norway	6, 479, 168	43, 058, 443	12, 740, 975	30, 317, 468	4.68
Danish Kingdom	2, 096, 400	39, 228, 000	14, 070, 000	25, 158, 000	12.00
Netherlands	4, 061, 580	163, 847, 949	55, 114, 112	108, 733, 837	26.77
Russia	98, 323, 000	646, 431, 794	124, 008, 153	522, 423, 641	5.31
Turkey	24, 987, 000	83, 315, 976	14, 520, 000	68, 795, 976	2.75
Roumania	5, 376, 000	27, 372, 383	3, 995, 298	23, 377, 085	4.35
Mexico	9, 557, 279	52, 048, 529	1, 763, 008	50, 285, 521	5.26
Central America	2, 891, 600	4, 701, 861	.....	4, 701, 861	1.62
Argentine Republic	2, 540, 000	71, 371, 850	14, 196, 461	57, 175, 389	22.51
Colombia	3, 000, 000	5, 097, 830	200, 000	4, 897, 830	1.63
Brazil	11, 108, 291	139, 871, 255	.....	139, 871, 255	12.59
Peru	3, 050, 000	14, 980, 820	1, 882, 018	13, 098, 802	4.29
Venezuela	2, 075, 245	2, 682, 700	.....	2, 682, 700	1.00
Chili	2, 420, 500	32, 555, 341	2, 398, 000	30, 157, 341	12.45
Bolivia	2, 325, 000	6, 908, 533	443, 597	6, 464, 936	2.78
Uruguay	438, 245	11, 587, 000	4, 601, 000	6, 986, 000	15.94
Hayti	572, 000	4, 780, 000	.....	4, 780, 000	8.35
Japan	36, 700, 110	248, 744, 805	28, 486, 973	220, 257, 832	6.00
Hawaiian Islands	66, 895	1, 834, 900	808, 200	1, 026, 700	15.35
		9, 991, 964, 524	1, 959, 571, 764	8, 032, 392, 760	

XXXV.—*COINAGE at the MINTS by CALENDAR YEARS.*

MINT AT PHILADELPHIA.

GOLD.

eriod.	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
.....	$8, 787, 500	$166, 060	$490, 940	$62, 678	$535, 325 00	$774, 789
.....	4, 234, 280	25, 210	75, 680	6, 399	118, 442 50	117, 975
.....	871, 940	160, 930	84, 070	46, 914	98, 610 00	168, 244
.....	11, 553, 400	117, 330	99, 125	21, 465	56, 687 50	36, 668
.....	59, 529, 060	1, 132, 330	3, 199, 750	18, 216	3, 181, 295 00	527, 499
.....	1, 842, 660	109, 950	22, 325	17, 355	280, 882 50	1, 326, 865
.....	2, 855, 800	12, 480	12, 360	15, 117	75 00	6, 250
.....	4, 085, 700	35, 800	21, 100	8, 040	7, 185 00	5, 950
.....	7, 024, 000	40, 050	6, 475	3, 495	3, 862 50	3, 725
.....	13, 975, 500	37, 800	33, 600	12, 090	7, 775 00	7, 180
.....	5, 021, 300	31, 400	34, 600	7, 950	8, 125 00	5, 250
.....	1, 972, 000	106, 550	28, 625	14, 625	9, 062 50	10, 525
.....	3, 503, 100	18, 550	8, 925	7, 575	10, 862 50	5, 925
.....	3, 103, 700	25, 350	20, 175	10, 605	11, 387 50	6, 335
.....	1, 603, 000	17, 800	16, 150	3, 990	13, 375 00	3, 930
.....	5, 037, 600	16, 500	8, 450	6, 090	7, 575 00	3, 530
.....	34, 196, 500	8, 250	562, 525	75	445, 062 50	125, 125
.....	7, 336, 000	531, 600	17, 540	125, 460	9, 850 00	198, 820
.....	5, 914, 800	1, 200	1, 100	60	1, 050 00	420
.....	11, 678, 100	7, 320	7, 385	135	10, 552 50	3, 245
.....	7, 953, 400	8, 170	5, 760	4, 464	4, 130 00	3, 920
.....	10, 872, 900	738, 000	658, 700	246, 972	715, 650 00	3, 020
.....	4, 152, 600	3, 847, 700	1, 509, 750	9, 090	222, 475 00	3, 030
.....	1, 029, 120	16, 448, 760	15, 832, 180	3, 108	7, 490 00	1, 636
.....	45, 200	38, 772, 600	28, 544, 000	1, 650	1, 700 00	7, 660
.....	12, 600	23, 244, 800	12, 572, 800	4, 620	10, 100 00	5, 040
.....	800	2, 087, 400	1, 167, 200	2, 820	4, 900 00	10, 840
.....	1, 420	769, 050	955, 240	3, 318	4, 982 50	6, 206

SILVER.

Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
.....	$94, 000	$994, 000 00	$2, 411, 000 00	.....	$558, 000 00	$364, 000 00	$31, 260 00
.....	.....	2, 113, 000 00	1, 842, 000 00	.....	154, 000 00	175, 000 00	48, 120 00
.....	256, 500	374, 000 00	336, 000 00	.....	43, 000 00	17, 000 00	10, 950 00
.....	218, 930	151, 850 00	201, 350 00	.....	60, 700 00	39, 950 00	8, 610 00
.....	78, 500	1, 444, 200 00	1, 213, 650 00	.....	192, 400 00	164, 050 00	14, 940 00
.....	12, 090	126, 175 00	233, 137 50	.....	84, 755 00	74, 627 50	10, 906 50
.....	27, 660	251, 830 00	48, 015 00	.....	1, 446 00	923 00	643 80
.....	31, 170	189, 785 00	23, 517 50	.....	3, 907 00	23 50	14 10
.....	47, 000	255, 950 00	14, 825 00	.....	1, 050 00	675 00	255 00
.....	49, 625	372, 812 50	4, 381 25	.....	872 50	536 25	681 70
.....	60, 325	212, 162 50	5, 156 25	.....	662 50	431 25	188 70
.....	182, 700	189, 100 00	7, 500 00	.....	46, 625 00	4, 295 00	123 00
.....	424, 300	397, 950 00	4, 150 00	.....	25, 660 00	10, 430 00	153 00
.....	433, 000	300, 450 00	21, 850 00	.....	47, 150 00	26, 330 00	120 00
.....	1, 115, 760	582, 680 00	42, 808 00	.....	75, 361 00	74, 443 00	127 80
.....	1, 106, 450	440, 775 00	45, 737 50	.....	239, 645 00	147, 397 50	58 60
$397, 500	293, 600	1, 308, 750 00	371, 075 00	.....	394, 710 00	35, 630 00	18 00
987, 800	.....	1, 180, 150 00	117, 975 00	.....	294, 070 00	.....	.....
218, 900	.....	3, 013, 750 00	1, 073, 375 00	$7, 940	1, 035, 070 00	.....	.....
456, 150	.....	4, 209, 575 00	4, 454, 287 50	3, 180	1, 146, 115 00	.....	.....
3, 039, 710	.....	4, 152, 255 00	2, 727, 927 50	102	731, 051 00	.....	.....
900	10, 509, 550	689, 200 00	565, 200 00	120	167, 880 00	.....	.....
.....	14, 807, 100	2, 950 00	3, 675 00	.....	1, 510 00	.....	.....
.....	12, 601, 355	4, 877 50	3, 738 75	.....	3, 735 50	.....	.....
.....	9, 163, 975	5, 487 50	3, 243 75	.....	2, 497 50	.....	.....
.....	11, 101, 100	2, 750 00	4, 075 00	.....	391, 110 00	.....	.....
.....	12, 291, 039	4, 519 50	3, 859 75	.....	767, 571 20	.....	.....
.....	14, 070, 875	2, 637 50	2, 218 75	.....	336, 638 00	.....	.....

XXXV.—*COINAGE at the MINTS by CALENDAR YEARS*—Contin

MINT AT PHILADELPHIA—Continued.

MINOR.

Period.	Five cents.	Three cents.	Two cents.	One cent.
1857	.....	.....	.....	$177, 834 56
1858	.....	.....	.....	246, 000 00
1859	.....	.....	.....	364, 000 00
1860	.....	.....	.....	205, 660 00
1861	.....	.....	.....	101, 000 00
1862	.....	.....	.....	280, 750 00
1863	.....	.....	.....	498, 400 00
1864	.....	.....	$396, 950 00	529, 737 14
1865	.....	$341, 460 00	272, 800 00	354, 292 86
1866	$737, 125 00	144, 030 00	63, 540 00	98, 265 00
1867	1, 545, 475 00	117, 450 00	58, 775 00	98, 210 00
1868	1, 440, 850 00	97, 560 00	56, 075 00	102, 665 00
1869	819, 750 00	48, 120 00	30, 980 00	64, 200 00
1870	240, 300 00	40, 050 00	17, 225 00	52, 750 00
1871	28, 050 00	18, 120 00	14, 425 00	39, 295 00
1872	301, 800 00	25, 860 00	1, 300 00	40, 420 00
1873	227, 500 00	35, 190 00	.....	116, 765 00
1874	176, 900 00	23, 700 00	.....	141, 875 00
1875	104, 850 00	6, 840 00	.....	135, 280 00
1876	126, 500 00	4, 860 00	.....	79, 440 00
1877	.....	.....	.....	8, 525 00
1878	117 50	70 50	.....	57, 998 50
1879	1, 455 00	1, 236 60	.....	162, 312 00
1880	997 75	748 65	.....	389, 649 55
1881	3, 618 75	32, 417 25	.....	392, 115 75
1882	573, 830 00	759 00	.....	385, 811 00
1883	1, 148, 471 05	318 27	.....	455, 981 09
1884	563, 697 10	169 26	.....	282, 617 42

MINT AT SAN FRANCISCO.

GOLD.

Period.	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.
1857	19, 410, 000	260, 000	435, 000	42, 000	170, 00
1858	16, 934, 200	118, 000	93, 000	.....	3, 00
1859	12, 728, 900	70, 000	66, 100	.....	38, 00
1860	10, 899, 000	50, 000	106, 000	21, 000	89, 00
1861	15, 360, 000	155, 000	90, 000	.....	60, 00
1862	17, 083, 460	125, 000	47, 500	.....	20, 00
1863	19, 331, 400	100, 000	85, 000	.....	27, 00
1864	15, 873, 200	25, 000	19, 440	.....	.....
1865	20, 850, 000	167, 000	138, 060	.....	58, 44
1866	16, 845, 000	200, 000	219, 800	.....	97, 40
1867	18, 415, 000	90, 000	145, 000	.....	70, 00
1868	16, 750, 000	135, 000	260, 000	.....	85, 00
1869	13, 735, 000	64, 300	155, 000	.....	73, 75
1870	19, 640, 000	80, 000	85, 000	.....	40, 00
1871	18, 560, 000	165, 000	125, 000	.....	55, 00
1872	15, 600, 000	173, 000	182, 000	.....	45, 00
1873	20, 812, 000	120, 000	155, 000	.....	67, 50
1874	24, 280, 000	100, 000	80, 000	.....	.....
1875	24, 600, 000	.....	45, 000	.....	29, 00
1876	31, 940, 000	50, 000	20, 000	.....	12, 50
1877	34, 700, 000	170, 000	133, 500	.....	88, 50
1878	34, 780, 000	261, 000	723, 500	.....	445, 00
1879	24, 476, 000	2, 240, 000	2, 131, 000	.....	108, 75
1880	16, 720, 000	5, 062, 500	6, 744, 500	.....	.....
1881	14, 540, 000	9, 700, 000	4, 845, 000	.....	.....
1882	22, 500, 000	1, 320, 000	4, 845, 000	.....	.....
1883	23, 780, 000	380, 000	416, 000	.....	.....
1884	18, 320, 000	1, 242, 500	885, 000	.....	.....

XXXV.—*COINAGE at the MINTS by CALENDAR YEARS*—Continued.

MINT AT SAN FRANCISCO—Continued.

SILVER.

Period.	Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
57			79,000 00	20,500 00				
58			238,000 00	80,250 00		6,000 00		
59			283,000 00	20,000 00		6,000 00		
60			236,000 00	14,000 00		14,000 00		
61			469,750 00	24,000 00		17,250 00		
62			676,000 00	16,750 00		18,075 00		
63			458,000 00			15,750 00	5,000 00	
64			329,000 00	5,000 00		23,000 00	4,500 00	
65			337,500 00	10,250 00		17,500 00	6,000 00	
66			527,000 00	7,000 00		13,500 00	6,000 00	
67			598,000 00	12,000 00		14,000 00	6,000 00	
68			580,000 00	24,000 00		26,000 00	14,000 00	
69			330,000 00	19,000 00		45,000 00	11,500 00	
70			502,000 00			5,000 00		
71			1,089,000 00	7,725 00		32,000 00	8,050 00	
72		9,000	290,000 00	20,750 00		19,000 00	41,850 00	
73	703,000	700	116,500 00	39,000 00		45,500 00	16,200 00	
74	2,549,000		197,000 00	98,000 00		24,000 00		
75	4,487,000		1,600,000 00	170,000 00	231,000	907,000 00		
76	5,227,000		2,264,000 00	2,149,000 00		1,042,000 00		
77	9,519,000		2,678,000 00	2,249,000 00		234,000 00		
78	4,162,000	9,774,000	6,000 00	35,000 00				
79		9,110,000						
80		8,900,000						
81		12,760,000						
82		9,250,000						
83		6,250,000						
84		3,200,000				56,496 90		

MINT AT NEW ORLEANS.

GOLD.

Period.	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1857	600,000	55,000	65,000		85,000	
1858	705,000	200,000				
1859	182,000	23,000				
1860	132,000	111,000				
1861*	854,820					
1879	46,500	15,000				
1880		92,000				
1881		83,500				
1882		108,200				
1883		8,000				
1884						

*No coinage from 1862 to 1878, inclusive.

SILVER.

Period.	Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
1857			409,000 00	295,000 00		154,000 00	69,000 00	
1858			3,647,000 00	130,000 00		29,000 00	83,000 00	
1859		360,000	1,417,000 00	65,000 00		48,000 00	28,000 00	
1860		515,000	645,000 00	97,000 00		4,000 00	53,000 00	
1861*			1,266,316 50					
1879		2,887,000						
1880		5,305,000						
1881		5,708,000						
1882		6,090,000						
1883		8,725,000						
1884		9,730,000						

*No coinage from 1862 to 1878, inclusive.

XXXV.—*COINAGE at the MINTS by CALENDAR YEARS*—Continued

MINT AT CARSON.

GOLD.

Period.	Double eagles.	Eagles.	Half eagles.	Three dollars.	Quarter eagles.	Dollars.
1870	75,780	59,080	38,375			
1871	293,740	71,850	103,850			
1872	593,000	55,000	84,900			
1873	448,200	45,430	37,080			
1874	2,301,700	167,670	105,990			
1875	2,223,020	77,150	59,140			
1876	2,768,820	46,960	34,435			
1877	851,300	33,320	43,400			
1878	263,600	32,440	45,270			
1879	214,160	17,620	86,405			
1880		27,100	95,985			
1881		240,150	69,430			
1882	782,800	67,640	414,085			
1883	1,199,240	120,000	64,790			
1884	1,622,780	99,250	82,010			

SILVER.

Period.	Trade dollars.	Dollars.	Half dollars.	Quarter dollars.	Twenty cents.	Dimes.	Half dimes.	Three cents.
1870		12,462	27,308 50	2,722 50				
1871		1,376	69,975 00	2,275 00		2,010 00		
1872		3,150	136,000 00	4,115 50		2,490 00		
1873	124,500	2,300	168,530 00			3,119 10		
1874	1,373,200		29,500 00			1,081 70		
1875	1,573,700		504,000 00	35,000 00	26,658	484,500 00		
1876	507,000		978,000 00	1,236,000 00	2,000	827,000 00		
1877	534,000		710,000 00	1,048,000 00		770,000 00		
1878	97,000	2,212,000	31,000 00	249,000 00		20,000 00		
1879		756,000						
1880		198,000						
1881		296,000						
1882		1,133,000						
1883		1,204,000						
1884		1,136,000						

XXXVI.—*STATEMENT of COINAGE of SUBSIDIARY SILVER COIN.*

Period.	Half dollars.	Quarter dollars.	Twenty-cent pieces.	Dimes.	Total.
1853 to 1872	$38,766,196	$17,883,790		$4,821,470	
1853 to 1872				*3,008,263	
1853 to 1872				†536,898	
January 1, 1873, to January 31, 1875	3,361,580	630,236		817,510	$4,809,326
From 1853 to 1875	37,127,729	18,514,026		9,184,141	64,825,896
February 1, 1875, to July 31, 1876	7,133,025	5,015,512	$270,718	3,543,635	15,962,890
August 1, 1876, to December 31, 1884	13,332,827	10,993,213	282	4,050,510	28,376,832
Total since passage of resumption act	20,465,852	16,008,725	271,000	7,594,135	44,339,722
Total since passage of coinage act	23,827,432	16,638,961	271,000	8,411,645	49,149,038
Total since 1853	57,593,581	$34,522,751	271,000	16,778,276	109,165,311

*Half dimes. †Three cents.

II.—*AVERAGE QUOTATION of STERLING SILVER each year, from* 1846 *inclusive, and value of a FINE OUNCE, and RELATIVE VALUE of GOLD LVER each year.*

r	In pence.	In cents.	Ratio.	Calendar years.	In pence.	In cents.	Ratio.
....	59 1/16	130. 0	1 to 15. 89	1866.....	61 1/8	133. 9	1 to 15. 42
....	59 1/16	130. 8	1 to 15. 79	1867.....	60 9/16	132. 8	1 to 15. 57
....	59 1/16	130. 4	1 to 15. 85	1868.....	60 1/4	132. 6	1 to 15. 58
....	59 1/2	130. 9	1 to 15. 78	1869.....	60 7/16	132. 5	1 to 15. 60
....	60 7/16	131. 6	1 to 15. 70	1870.....	60 9/16	132. 8	1 to 15. 57
....	61	133. 7	1 to 15. 46	1871.....	60 1/4	132. 6	1 to 15. 58
....	60 1/4	132. 6	1 to 15. 58	1872.....	60 3/16	132. 2	1 to 15. 68
....	61 1/8	134. 8	1 to 15. 33	1873.....	59 1/4	129. 8	1 to 15. 91
....	61 1/8	134. 8	1 to 15. 33	1874.....	58 3/16	127. 8	1 to 16. 17
....	61 3/16	134. 4	1 to 15. 38	1875.....	56 7/8	124. 6	1 to 16. 58
....	61 3/16	134. 4	1 to 15. 38	1876.....	52 3/4	115. 6	1 to 17. 73
....	61 1/2	135. 3	1 to 15. 27	1877.....	54 13/16	120. 1	1 to 17. 20
....	61 3/16	134. 4	1 to 15. 38	1878.....	52 9/16	115. 2	1 to 17. 93
....	62 1/16	136. 0	1 to 15. 19	1879.....	51 1/2	112. 3	1 to 18. 41
....	61 11/16	135. 2	1 to 15. 28	1880.....	52 1/2	114. 5	1 to 18. 06
....	60 15/16	133. 3	1 to 15. 50	1881.....	51 13/16	113. 8	1 to 18. 11
....	61 1/16	134. 6	1 to 15. 35	1882.....	51 7/16	113. 6	1 to 18. 19
....	61 1/2	134. 5	1 to 15. 36	1883.....	51 1/2	111. 8	1 to 18. 49
....	61 1/2	134. 5	1 to 15. 36	1884.....	50 7/8	111. 3	1 to 18. 57
....	61 1/16	133. 8	1 to 15. 44				

III.—*STATEMENT showing, in UNITED STATES MONEY, the AVERAGE ET VALUE at LONDON of the SILVER CONTAINED in a UNITED 'S SILVER DOLLAR each year from* 1870 *to* 1884.

ars.	Value.	Years.	Value.	Years.	Value.
.....	1. 0271	1875.....	0. 9637	1880	0. 8856
.....	1. 0256	1876.....	0. 8941	1881	0. 8802
.....	1. 0225	1877.....	0. 9289	1882	0. 8786
.....	1. 0040	1878.....	0. 8910	1883	0. 8647
.....	0. 9885	1879.....	0. 8686	1884	0. 8608

.—*CIRCULAR ESTIMATING AND PROCLAIMING, IN UNITED 'S MONEY OF ACCOUNT, THE VALUES OF THE STANDARD COINS RCULATION OF THE VARIOUS NATIONS OF THE WORLD.*

TREASURY DEPARTMENT, BUREAU OF THE MINT,
Washington, D. C., January 1, 1885.

In pursuance of the provisions of section 3564 of the Revised s of the United States, I have estimated the values of the stand- is in circulation of the various nations of the world, and submit e in the accompanying table.

Very respectfully,

HORATIO C. BURCHARD,
Director.

HUGH MCCULLOCH,
Secretary of the Treasury.

Estimate of values of foreign coins.

Country.	Monetary unit.	Standard.	Value in U. S. money.	Standard coin.
Argentine Republic.	Peso	Gold and silver	$0.965	1/10, 1/5, 1/2, 1, and 1 peso, 1 argentine and argentine.
Austria	Florin	Silver	.393	
Belgium	Franc	Gold and silver	.193	5, 10, and 20 francs.
Bolivia	Boliviano	Silver	.795	Boliviano.
Brazil	Milreis of 1,000 reis	Gold	.546	
British Possessions in North America.	Dollar	do	1.00	
Chili	Peso	Gold and silver	.912	Condor, doubloon, and escudo.
Cuba	do	do	.932	1/10, 1/5, 1/2, and 1 doubloon.
Denmark	Crown	Gold	.268	10 and 20 crowns.
Ecuador	Peso	Silver	.795	Peso.
Egypt	Piaster	Gold	.049	5, 10, 25, 50, and 100 piasters.
France	Franc	Gold and silver	.193	5, 10, and 20 francs.
German Empire	Mark	Gold	.238	5, 10, and 20 marks.
Great Britain	Pound sterling	do	4.866½	1 sovereign and sovereign.
Greece	Drachma	Gold and silver	.193	5, 10, 20, 50, and 100 drachmas.
Hayti	Gourde	do	.965	1, 2, 5, and 10 gourdes.
India	Rupee of 16 annas	Silver	.378	
Italy	Lira	Gold and silver	.193	5, 10, 20, 50, and 100 lire.
Japan	Yen	Silver	.858	1, 2, 5, 10, and 20 yen, gold, and silver yen.
Liberia	Dollar	Gold	1.00	
Mexico	do	Silver	.864	Peso or dollar, 5, 10, 25, and 50 centavo.
Netherlands	Florin	Gold and silver	.402	
Norway	Crown	Gold	.268	10 and 20 crowns.
Peru	Sol	Silver	.795	Sol.
Portugal	Milreis of 1,000 reis	Gold	1.08	2, 5, and 10 milreis.
Russia	Rouble of 100 copecks	Silver	.636	1/4, 1/2, and 1 rouble.
Spain	Peseta of 100 centimes	Gold and silver	.193	5, 10, 20, 50, and 100 pesetas.
Sweden	Crown	Gold	.268	10 and 20 crowns.
Switzerland	Franc	Gold and silver	.193	5, 10, and 20 francs.
Tripoli	Mahbub of 20 piasters	Silver	.717	
Turkey	Piaster	Gold	.044	25, 50, 100, 250, and 500 piasters.
United States of Colombia.	Peso	Silver	.795	Peso.
Venezuela	Bolivar	Gold and silver	.193	5, 10, 20, 50, and 100 bolivar.

TREASURY DEPARTMENT,
Washington, D. C., January 1, 1885.

The foregoing estimation, made by the Director of the Mint, of the value of the foreign coins above mentioned, I hereby proclaim to be the values of such coins expressed in the money of account of the United States, and to be taken in estimating the values of all foreign merchandise, made out in any of said currencies, imported on or after January 1, 1885.

H. McCULLOCH,
Secretary of the Treasury.

XL.—*USE OF THE PRECIOUS METALS IN THE ARTS AND MANUFACTURES.*

UNITED STATES ASSAY OFFICE, NEW YORK CITY,
SUPERINTENDENT'S OFFICE,
January 8, 1885.

SIR: In answer to your letter of the 2nd inst., I forward herewith statements showing the approximate amounts of gold and silver bars, prepared at this office during the calendar year 1884, for manufacturers' use, similar to the statement on page 675 of the Report of the Director of the Mint on the production of gold and silver in the United States

lar year 1883, and page 62 of the last Annual Report of the he Mint, viz:

d to depositors used in the arts, &c., during the calendar year 1884.

	Gold.	Silver.
	.....	$1,544 11
	$41,505 39	69,082 67
	344,001 48	581,127 52
	604,357 43	168,559 61
	2,849,649 28	4,519,407 42
	3,839,513 53	5,339,721 33
changed for gold coin and redeposited for small bars, s charges and fractions paid in gold coin	1,117,061 71	.....
	4,956,575 24	.....
changed for gold coin and taken by manufacturers	1,077,352 78	.....
	6,033,928 02	.....

espectfully,

ANDREW MASON,
Superintendent.

, BURCHARD,
or of the Mint, Washington, D. C.

ITS of ENGLISH SOVEREIGNS and GERMAN GOLD MARKS at RK ASSAY OFFICE, during the third and fourth quarters of 1881 *and ear* 1882.

	Sovereigns.	Marks.	Total.
er 30, 1881	$2,362,095 53	$525,183 09	$2,887,278 62
nber 31, 1881	1,056,208 81	98,417 93	1,154,626 74
h 31, 1882	6,767 52	58,953 99	65,721 51
1882	.....	75,582 08	75,582 08
er 30, 1882	.....	107,480 04	107,480 04
nber 31, 1882	425,783 19	78,092 97	503,876 16
	3,850,855 05	943,710 10	4,794,565 15

AGE and COMPARATIVE PRICES of the PRINCIPAL DOMESODITIES exported from the UNITED STATES from DECLARED ime of EXPORT.

modities.	Average price during fiscal years—			Percentage of price of 1884 to price of 1870.	Percentage of price of 1884 to price of 1883.
	1870.	1883.	1884.		
.....head..	$15.736	$16.896	$13.528	85.9	80.0
.....do....	141.055	114.835	131.162	92.9	114.2
.....do....	2.405	3.424	3.105	129.1	90.7
rl.....pound..	.072	.058	.056	77.7	96.5
.....dozen..	2.091	1.854	1.896	90.6	102.2
.....gallon..	.357	.375	.309	86.5	82.4
.....bushel..	.549	.690	.556	101.2	80.6
....pound..	.057	.049	.048	84.2	97.9
.....bushel..	.924	.683	.611	66.1	89.3
.....barrel..	5.001	2.670	3.238	64.7	121.2
.....bushel..	.629	.506	.398	63.3	78.6
.....do....	1.131	.764	.695	61.4	91.0
.....barrel..	5.514	4.156	4.136	75.0	99.5
.....bushel..	1.289	1.126	1.066	82.7	94.7

XLIII.—*AVERAGE and COMPARATIVE PRICES of the PRINCIPAL DOMESTIC COMMODITIES*—Continued.

Commodities.	Average price during fiscal years—			Percentage of price of 1884 to price of 1870.	Percentage of price of 1884 to price 1883
	1870.	1883.	1884.		
Wheat flour.....barrel..	$6.112	$5.955	$5.588	91.4	
Brick.....M..	11.112	8.854	7.590	68.3	
Candles.....pound..	.164	.124	.126	76.8	1
Coal:					
Anthracite.....ton..	4.710	4.747	3.061	64.9	
Bituminous.....do....	6.632	3.440	4.705	70.9	1
Copper, pig and bar.....pound..	.174	.157	.148	85.0	
Cordage, rope, twine.....do....	.205	.109	.096	04.7	
Cotton:					
Sea island.....do....	.537	.202	.323	60.1	1
Other.....do....	.235	.107	.105	44.7	
Colored.....yard..	.170	.077	.072	42.3	
Uncolored.....do....	.162	.083	.075	46.3	
Apples, dried.....pound..	.094	.077	.071	75.5	
Glue.....do....	.251	.181	.164	65.3	
Hay.....ton..	17.423	19.656	18.322	105.2	
Hops.....pound..	.153	.718	.242	158.2	
Ice.....ton..	4.068	2.599	2.305	56.6	
India-rubber boots, &c.....pair..	3.245	1.382	1.208	37.2	
Iron:					
Pig.....pound..	.016	.015	.013	81.2	
Bar.....do....	.050	.034	.030	60.0	
Boiler plate.....do....	.046	.036	.....	.....	
Railroad bars.....do....	.036	.032	.029	80.5	
Sheet, band, &c.....do....	.054	.049	.047	87.0	
Car wheels.....piece..	19.914	10.662	9.427	47.3	
Nails and spikes.....pound..	.057	.035	.033	57.9	
Steel ingots.....do....	.119	.092	.106	89.0	
Boots and shoes.....pair..	1.519	1.219	1.201	79.0	
Lime and cement.....barrel..	1.972	1.608	1.649	83.6	
Oil cake.....pound..	.021	.013	.014	66.6	
Mineral oil, crude.....gallon..	.206	.074	.079	38.3	
Naphthas, benzine, &c.....do..	.104	.076	.071	68.2	
Illuminating oil.....do....	.305	.087	.092	30.1	
Lard oil.....do....	1.375	.931	.707	51.4	
Neatsfoot oil.....do....	1.295	.892	.941	72.4	
Sperm oil.....do....	1.589	1.055	.948	59.6	
Whale oil.....do....	.734	.508	.390	53.1	
Linseed oil.....do....	1.058	.638	.660	62.4	
Gunpowder.....pound..	.157	.153	.157	100.0	
Bacon.....do....	.157	.109	.102	64.9	
Hams.....do....	.157	.127	.102	64.9	
Fresh beef.....do....	.072	.102	.099	137.5	
Salted beef.....do....	.044	.089	.076	172.7	
Butter.....do....	.293	.185	.182	62.1	
Cheese.....do....	.158	.112	.103	67.3	
Eggs.....dozen..	.395	.208	.212	53.7	
Fish:					
Dried.....cwt..	5.187	5.871	5.824	112.2	
Pickled.....barrel..	8.185	7.069	6.593	80.5	
Lard.....pound..	.165	.118	.095	57.5	
Pork.....do....	.133	.099	.079	59.4	
Onions.....bushel..	1.675	.945	.859	51.3	
Potatoes.....do....	.690	.975	.675	97.8	
Quicksilver.....pound..	.406	.369	.344	84.7	
Rags.....do....	.089	.018	.019	21.3	
Rice.....do....	.059	.063	.060	101.7	
Salt.....bushel..	.401	.319	.392	97.7	
Cotton seed.....pound..	.....	.009	.012	.....	
Soap.....do....	.080	.051	.049	61.2	
Spermaceti.....do....	.329	.167	.187	56.8	
Spirits of turpentine.....gallon..	.418	.442	.344	82.3	
Starch.....pound..	.082	.046	.045	54.8	
Sugar:					
Brown.....do....	.112	.086	.073	65.2	
Refined.....do....	.125	.091	.071	57.6	
Molasses.....gallon..	.300	.223	.152	50.7	
Tallow.....pound..	.101	.083	.076	75.2	
Tobacco, leaf.....do....	.113	.082	.091	80.5	
Varnish.....gallon..	1.587	1.941	1.963	123.7	
Beeswax.....pound..	.396	.296	.310	78.3	
Boards, planks.....M feet..	20.732	16.788	17.063	82.3	
Timber, sawed.....cubic feet..	.171	.153	.112	65.5	
Wool, raw.....pound..	.....	.342	.296	.....	
Zinc, plates and bars.....do....	.096	.083	.076	79.2	
Average.....	.....	.....	.....	73.9	

—PRICES of PRINCIPAL COMMODITIES in the NEW YORK MARKET calendar years 1883 *and* 1884, *COMPARED with the PRICES of the preceding d with the average prices for FIFTY-SIX YEARS preceding* 1881.

Articles.	Average prices in New York.				Percentage of prices of 1883 to average prices.		Percentage of prices of 1884 to average prices.	
	For fifty-six years ending 1880.	For the year 1882.	For the year 1883.	For the year 1884.	Of fifty-six years ending 1880.	Of 1882.	Of fifty-six years ending 1880.	Of 1883.
ne.....barrel..	$5.448	$3.958	$3.410	$2.859	62.6	86.1	52.5	83.8
n.....do....	5.725	4.774	4.006	3.262	70.0	83.9	56.9	81.5
ar.....do....	3.999	3.247	2.723	2.694	68.1	83.8	67.4	98.9
eal.....do....	3.400	3.918	2.922	3.038	85.9	74.6	89.4	103.9
rn.....bushel..	1.349	1.277	1.206	1.016	89.4	94.4	75.3	84.2
n.....do....	1.282	1.285	1.100	.935	85.8	85.6	72.9	85.0
.....do....	.794	.833	.730	.691	91.9	87.6	87.0	94.6
.....do....	.437	.575	.503	.368	115.1	87.4	84.2	73.1
.....do....	.700	.796	.644	.616	92.0	80.9	88.0	95.7
.....do....	.929	.953	.830	.784	89.3	87.0	84.4	94.4
.....pound..	.826	.185	.180	.206	55.2	97.3	63.2	115.0
ne.....do....	.....	.178	.190	.16	.....	106.7	.....	84.2
ucite.....ton..	6.356	4.335	4.350	4.106	68.4	100.3	64.6	94.4
ool.....chaldron..	8.980	11.000	11.000	.....	122.5	100.0	.....	.....
.....pound..	.122	.098	.104	.109	85.2	106.1	89.3	104.8
.....do....	.153	.160	.177	.165	115.6	110.6	107.8	93.2
.....do....	.190	.185	.160	.141	84.2	86.5	74.2	88.1
.....	.292	.300	.260	.22	89.0	86.7	75.3	84.6
ing.....	.259	.280	.240	.20	92.6	85.7	77.2	83.3
land.....pound..	.146	.118	.103	.109	70.5	87.3	74.7	105.8
.....cwt..	3.715	6.574	6.311	5.267	169.8	96.0	141.8	83.5
rel.....barrel..	12.266	18.790	17.520	21.534	142.8	93.2	175.5	122.9
ds.....pound..	.150	.165	.165	.16	110.0	100.0	106.7	96.9
s.....box..	2.327	1.800	2.500	1.92	107.4	138.9	82.7	77.0
.....pound..	.087	.124	.168	.134	193.1	135.5	154.0	79.8
.....do....	.128	.066	.062	.05	48.4	93.9	39.0	80.6
er.....do....	3.248	3.250	3.250	3.25	100.1	100.0	100.0	100.0
r:								
.....25 pounds..	4.374	6.250	6.250	5.00	142.8	100.0	112.2	80.0
g.....do....	3.166	3.900	3.510	2.877	110.8	90.0	90.9	81.9
d.....ton...	205.488	196.000	175.000	182.08	85.1	89.3	88.6	104.0
sed.....do....	138.192	125.000	125.000	128.54	90.4	100.0	93.0	102.8
.....do....	212.922	175.000	162.500	166.04	76.3	92.9	77.9	102.2
American.....pound..	.172	.248	.239	.238	138.9	96.3	138.3	99.6
an.....do....	.154	.197	.185	.189	120.0	93.9	122.7	102.2
.....do....	.179	.458	.562	.245	314.0	122.7	136.9	43.6
.....do....	.881	.770	.800	.825	90.8	103.9	93.6	103.1
.....ton..	34.613	26.758	24.000	21.618	69.3	89.6	62.4	90.0
.....pound..	.069	.041	.040	.035	58.0	97.5	50.7	87.5
.....do....	.126	.122	.118	.113	93.6	96.7	89.7	95.8
.....cwt..	5.323	4.960	4.340	3.822	81.5	87.5	71.8	88.0
.....pound..	.203	.237	.232	.237	114.2	97.9	116.7	102.1
rleans.....gallon..	.403	.587	.529	.512	131.2	90.1	127.0	96.8
louse.....do....	.301	.238	.176	.119	58.4	73.9	39.5	67.6
ndies.....do....	.262	.498	.356	.334	135.8	71.4	127.8	93.8
.....pound..	.043	.041	.039	3.810	90.7	95.1	88.6	97.7
ht.....do....	.092	.053	.052	5.150	56.5	98.1	55.9	99.0
se:								
ltine.....gallon..	.490	.515	.428	.324	87.3	83.1	66.1	77.1
.....barrel..	2.983	2.115	1.623	1.351	54.4	76.7	45.3	83.2
.....gallon..	.420	.557	.560	.615	133.3	100.5	146.4	109.8
.....do....	1.176	1.083	1.008	.876	85.7	93.0	74.5	86.9

XLIII.—*PRICES of PRINCIPAL COMMODITIES in the NEW YORK MARKI for the calendar years* 1883 *and* 1884, *&c.*—Continued.

Articles.	Average prices in New York.				Percentage of prices of 1883 to average prices.		Percentage prices of 18 to average prices.	
	For fifty-six years ending 1880.	For the year 1882.	For the year 1883.	For the year 1884.	Of fifty-six years ending 1880.	Of 1882.	Of fifty-six years ending 1880.	Of 1883.
Oil—Continued:								
Olive ..... gallon..	$1.059	$0.960	$0.883	$0.875	83.3	91.9	82.6	9
Linseed ..... do....	.793	.630	.585	.562	73.7	92.8	70.9	9
Paint:								
Red lead ..... cwt....	7.363	6.300	5.800	5.700	78.7	92.0	77.4	9
White lead ..... do....	9.549	7.000	6.300	5.900	65.9	90.0	61.8	9
Petroleum:								
Crude ..... gallon..	.120	.070	.074	.073	61.6	105.7	60.8	9
Refined ..... do....	.221	.073	.079	.062	35.7	108.2	37.1	10
Pork:								
New mess ..... barrel..	14.870	17.040	16.690	16.363	112.2	97.8	110.0	9
Extra prime ..... do....	.....	.....	14.540	14.851	.....	.....	.....	10
Prime mess ..... do....	11.410	18.920	17.000	15.25	149.0	89.8	133.6	8
Family ..... do....	.....	.....	18.110	16.882	.....	.....	.....	9
Extra mess ..... do....	9.664	13.608	12.610	12.198	130.4	92.6	126.2	9
Extra plate ..... do....	.....	.....	14.410	.....	.....	.....	.....	.....
Plate ..... do....	.....	.....	13.400	.....	.....	.....	.....	.....
Packet ..... do....	.....	.....	14.350	13.042	.....	.....	.....	9
Family ..... do....	6.370	18.972	16.970	14.73	266.4	89.4	231.2	8
City extra India mess .. tierce..	.....	.....	.....	24.90	.....	.....	.....	.....
Hams ..... pound..	.085	.140	.139	.131	163.5	99.2	154.1	9
Shoulders ..... do....	.073	.092	.076	.072	104.1	82.6	98.6	9
Lard ..... do....	.091	.119	.100	.083	109.9	84.0	91.2	8
Butter ..... do....	.175	.224	.229	.252	128.0	102.2	144.0	11
Cheese ..... do....	.082	.119	.123	.117	150.0	103.3	142.7	9
Rice ..... cwt..	4.607	5.900	6.400	6.10	138.9	108.4	132.4	9
Salt:								
Liverpool ..... sack..	1.457	.750	.710	.70	48.7	94.6	48.3	9
Turk's Island ..... bushel..	.336	.222	.260	.22	77.3	117.1	65.5	8
Seeds:								
Clover ..... pound..	.092	.089	.130	.096	141.3	146.0	104.3	7
Timothy ..... bushel..	2.851	2.527	1.900	1.607	66.6	75.1	56.3	8
Soap:								
Brown ..... pound..	.055	.....	.....	.049	.....	.....	89.1	.....
Castile ..... do....	.109	.139	.133	.119	122.0	95.6	109.2	8
Spices:								
Pepper ..... do....	.101	.162	.152	.15	150.5	93.8	149.5	9
Nutmeg ..... do....	1.052	.800	.670	.52	63.6	83.7	49.4	7
Sugar:								
New Orleans ..... do....	.064	.....	.....	.....	.....	.....	.....	.....
Cuba ..... do....	.074	.073	.068	.053	91.9	93.1	71.6	7
Loaf ..... do....	.117	.099	.091	.074	77.8	91.9	63.2	8
Tallow, American ..... do....	.083	.083	.078	.071	93.9	93.9	85.5	9
Tea:								
Young Hyson ..... do....	.567	.239	.215	.215	37.9	89.9	37.9	10
Oolong ..... do....	.536	.230	.230	.23	42.9	100.0	42.9	10
Souchong ..... do....	.430	.222	.220	.22	51.1	99.1	51.2	10
Imperial ..... do	.700	.300	.300	.30	42.8	100.0	40.3	10
Tobacco:								
Kentucky ..... do....	.079	.093	.081	.091	102.5	87.1	115.2	9
Manufactured ..... do....	.171	.176	.180	.21	105.2	102.2	122.8	11
Havana ..... do....	.753	.895	.880	.85	116.8	98.3	112.9	9
Wool:								
Common ..... do....	.295	.306	.302	.265	102.4	98.7	90.0	8
Merino ..... do....	.445	.455	.440	.409	98.8	96.5	91.9	9
Pulled ..... do....	.350	.336	.331	.339	106.8	98.7	96.8	8
Average	.....	.....	.....	.....	100.2	95.3	91.2	9

—PRICES for the years 1883 and 1884 of the PRINCIPAL COMMODITIES RTED into the UNITED KINGDOM, of which quantities and values are given accounts relating to trade and navigation as officially published for those years, ed with the prices of the preceding year.

ncipal articles.	Year ended December 31, 1882.		Year ended December 31, 1883.			Year ended December 31, 1884.		
	Quantity.	Price per unit.	Quantity.	Price per unit.	Per cent. to 1882.	Quantity.	Price per unit.	Per cent. to 1883.
.....cwt.	67, 000	£1. 31	60, 200	£1. 35	103. 0	67, 000	£1. 03	76. 3
.....number.	264, 300	21. 24	367, 400	21. 56	101. 5	309, 600	22. 05	102. 2
.....do..	45, 000	19. 50	60, 000	19. 73	101. 2	61, 300	19. 60	99. 3
.....do..	34, 300	4. 69	47, 100	4. 68	95. 9	54, 400	4. 73	100. 8
(and lambs) ... do..	1, 124, 300	2. 27	1, 115, 600	2. 25	99. 1	945, 000	2. 27	100. 8
.....do..	15, 600	3. 67	38, 800	3. 43	93. 4	26, 400	3. 18	92. 7
.....cwt.	2, 348, 000	2. 64	3, 080, 100	2. 65	100. 3	2, 755, 900	2. 46	92. 0
.....do..	271, 500	0. 46	365, 300	0. 49	106. 5	430, 700	0. 45	91. 8
ıvian.....do..	188, 700	12. 83	117, 300	12. 18	94. 9	105, 900	8. 56	70. 2
..... do..	227, 700	2. 15	286, 800	2. 19	101. 8	210, 900	1. 98	90. 4
.....do..	460, 600	2. 78	800, 700	2. 81	101. 1	876, 200	2. 70	96. 0
manure .....tons.	54, 400	6. 48	73, 900	6. 82	105. 2	72, 600	6. 20	90. 9
.....cwt.	945, 500	0. 30	877, 600	0. 27	90. 0	759, 300	0. 25	92. 5
.....pounds	2, 563, 000	0. 16	2, 800, 000	0. 16	100. 0	2, 926, 500	0. 16	100. 0
d butterine.....cwt.	2, 167, 400	5. 23	2, 332, 700	5. 03	96. 2	2, 472, 500	5. 06	100. 5
ıc ..... do..	179, 900	15. 22	227, 400	15. 91	104. 5	198, 000	11. 45	71. 9
..... do..	1, 692, 400	2. 80	1, 797, 000	2. 71	96. 7	1, 926, 000	2. 59	95. 0
.....do..	128, 000	11. 86	127, 700	.....	.....	.....	.....	.....
.....number.	950, 600	0. 55	717, 800	0. 65	118. 1	698, 100	0. 62	95. 8
.....cwt	24, 900	9. 82	21, 100	7. 17	73. 0	14, 100	5. 68	79. 2
....tons	103, 200	10. 02	105, 800	10. 35	103. 3	124, 200	11. 10	107. 2
ns ....do..	49, 200	32. 70	57, 700	31. 89	97. 3	62, 400	28. 78	90. 2
ought .....do..	35, 500	67. 97	35, 600	65. 15	95. 8	39, 800	56. 30	86. 4
.....cwt.	64, 171, 600	0. 53	64, 080, 400	0. 49	92. 4	47, 113, 900	0. 42	85. 7
r .....do..	15, 519, 800	0. 35	16, 593, 700	0. 35	100. 0	12, 987, 200	0. 32	91. 4
.....do..	13, 646, 100	0. 33	15, 248, 400	0. 33	100. 0	12, 936, 100	0. 32	96. 9
.....do..	2, 100, 100	0. 39	1, 879, 600	0. 40	102. 5	1, 935, 400	0. 34	85. 0
.....do..	2, 070, 200	0. 38	3, 578, 100	0. 38	100. 0	3, 519, 500	0. 32	84. 2
ı corn or maize ..do..	18, 255, 200	0. 35	31, 538, 900	0. 32	91. 4	24, 794, 600	0. 29	91. 4
al and flour .....do..	13, 028, 700	0. 81	16, 293, 500	0. 75	92. 6	15, 103, 500	0. 67	89. 3
n meal .....do..	16, 400	1. 33	35, 800	0. 86	64. 6	16, 000	1. 49	173. 2
w.....do..	15, 794, 500	2. 29	15, 367, 800	2. 88	125. 7	15, 505, 800	2. 84	98. 9
gambier.....tons	30, 100	23. 04	26, 800	26. 47	114. 9	32, 200	25. 47	96. 2
.....G. H.	6, 757, 200	0. 35	7, 826, 600	0. 34	97. 1	8, 275, 500	0. 35	102. 9
.....cwt.	862, 500	1. 92	868, 100	2. 04	106. 2	814, 600	1. 83	89. 8
.....do..	1, 966, 900	1. 83	1, 546, 900	1. 86	101. 6	1, 606, 900	1. 88	101. 0
ow.....do..	790, 200	0. 78	683, 700	0. 78	100. 0	744, 900	0. 69	88. 4
.....	74, 300	2. 04	84, 700	2. 11	103. 4	87, 600	1. 91	90. 5
merated.....cwt	475, 500	1. 90	610, 400	1. 46	76. 8	611, 700	1. 52	104. 1
.....tons.	45, 000	8. 65	73, 900	9. 76	112. 8	48, 200	9. 09	93. 1
ic .....cwt.	115, 900	2. 17	80, 500	2. 23	102. 7	57, 400	3. 02	135. 4
l, shell, stick, and .....cwt	113, 300	4. 53	115, 800	4. 25	93. 8	112, 900	4. 11	96. 7
cha.....do..	72, 600	7. 39	63, 900	7. 43	100. 5	62, 700	7. 38	99. 2
....do..	548, 500	2. 77	602, 000	3. 02	109. 0	653, 000	2. 95	97. 7
nnets of straw ..lbs	355, 300	0. 13	366, 800	0. 20	153. 8	301, 400	0. 19	93. 0
..... cwt	1, 354, 400	1. 60	1, 440, 500	1. 64	102. 5	1, 334, 900	1. 55	95. 1
.....do..	576, 400	3. 63	634, 300	3. 55	97. 7	646, 800	3. 54	99. 7
.....do..	613, 500	2. 66	562, 700	2. 75	103. 4	572, 100	2. 78	101. 0
.....do..	315, 300	9. 05	125, 300	8. 50	93. 9	257, 300	6. 29	74. 0
.....do..	95, 400	28. 37	100, 700	24. 50	86. 3	104, 400	23. 78	97. 0
teel: re .....tons.	3, 282, 400	0. 93	3, 178, 300	0. 86	92. 4	2, 728, 600	0. 77	89. 5
.....do..	139, 600	10. 03	122, 800	10. 06	100. 3	115, 000	10. 06	100. 0
merated.....cwt	3, 460, 500	0. 71	3, 883, 200	0. 74	104. 2	3, 716, 100	0. 73	98. 6
nwrought .....tons	5, 800	11. 12	4, 500	13. 33	120. 3	6, 700	13. 11	97. 9
.....do..	5, 964, 300	0. 72	7, 398, 000	0. 61	84. 7	5, 111, 300	0. 70	114. 7
.....cwt.	665, 800	2. 81	852, 100	2. 63	93. 6	698, 300	2. 20	84. 0
and sheet.....tons.	87, 700	14. 42	101, 500	12. 83	88. 9	109, 000	11. 20	87. 3
.....pounds.	74, 953, 600	0. 07	74, 471, 600	0. 07	100. 0	76, 756, 300	0. 07	100. 0
oots and shoes. dozen	109, 200	3. 97	122, 600	3. 42	86. 1	110, 600	3. 17	92. 7
loves.....doz. pairs.	1, 615, 300	1. 18	1, 666, 700	1. 16	98. 3	1, 494, 500	1. 12	96. 5
ıd garancine ....cwt.	23, 100	1. 42	21, 500	1. 30	91. 5	23, 200	1. 33	102. 3
r fresh.....do..	13, 000	3. 07	36, 400	3. 07	100. 0	19, 500	3. 23	105. 2
rved.....do..	559, 900	3. 02	609, 300	2. 87	95. 3	449, 000	3. 10	108. 0

XLIV.—*PRICES for the years* 1883 *and* 1884 *of the PRINCIPAL COMMODITIES IMPORTED into the UNITED KINGDOM, &c.*—Continued.

Principal articles.	Year ended December 31, 1882.		Year ended December 31, 1883.			Year ended December 31, 1884.		
	Quantity.	Price per unit.	Quantity.	Price per unit.	Per cent. to 1882.	Quantity.	Price per unit.	Per cent. to 1883.
Nitre (nitrate of soda) ....do..	1,915,100	£0.66	2,049,200	£0.57	86.3	2,030,900	£0.48	84.2
Oil:								
Train .....tons.	15,900	33.08	16,800	35.52	107.3	17,500	30.26	85.4
Palm .....cwt.	801,500	1.52	743,500	1.75	115.1	825,800	1.68	96.0
Cocoanut.....do..	136,000	1.57	210,800	1.73	110.1	245,600	1.62	93.6
Olive.....tons.	23,100	40.43	30,900	38.63	95.5	17,200	41.61	107.7
Seed ..... do..	14,600	32.70	10,500	34.84	106.5	12,500	30.76	88.0
Turpentine .....cwt.	357,800	1.78	350,100	1.58	88.7	462,100	1.21	76.6
Oil-seed cakes ..... tons.	190,200	7.67	257,400	7.16	93.3	269,200	7.56	105.5
Oranges and lemons...bushels.	4,245,200	0.39	4,480,600	0.39	100.0	4,958,800	0.36	92.3
Paper:								
For printing or writing.cwt	190,000	1.76	209,400	1.64	93.2	.....	.....	...
Other (except hangings).do..	911,400	0.95	952,700	0.94	99.0	1,239,000	0.87	92.4
Petroleum.....gallons	59,185,300	0.02	70,185,500	0.03	150.0	52,808,400	0.03	100.0
Pork:								
Salted (not hams). . cwt.	266,200	1.97	328,700	1.93	98.0	278,300	1.68	87.0
Fresh .....do..	23,400	2.44	47,300	2.62	107.3	58,700	2.59	98.8
Potatoes ..... do..	2,997,500	0.33	5,149,800	0.30	90.9	2,444,000	0.33	110.0
Pyrites of iron, copper, and sulphur .....tons.	626,900	2.26	600,600	2.25	99.5	563,000	2.21	98.2
Quicksilver.....pounds.	3,444,000	0.08	4,088,900	0.07	87.5	4,497,700	0.07	100.0
Rags for paper:								
Linen and cotton .....tons.	20,900	14.35	29,600	13.57	94.5	36,200	13.48	99.3
Esparto, or other vegetable fiber.....tons.	181,000	7.07	206,500	6.69	94.6	184,600	6.10	91.1
Rice .....cwt.	8,249,700	0.39	7,758,800	0.40	102.5	6,500,900	0.40	100.0
Rosin .....do..	1,227,500	0.32	1,363,600	0.29	90.6	1,470,900	0.25	86.2
Saltpeter .....do..	322,200	1.09	284,400	1.00	91.7	333,700	0.92	91.0
Seeds:								
Clover and grass .....do..	354,800	2.13	317,200	2.38	117.7	290,000	2.26	93.8
Cotton .....tons.	210,200	7.44	249,200	7.40	99.4	191,100	7.59	102.5
Flax and linseed..quarters.	2,437,900	2.15	2,337,800	2.06	95.8	1,805,500	2.12	102.9
Rape .....do..	547,600	1.88	775,300	2.15	114.3	769,800	1.95	90.7
Silk:								
Raw.....pounds.	3,375,300	0.82	3,184,100	0.81	98.7	4,519,900	0.74	90.1
Knubs or husks, waste.cwt.	44,300	13.26	61,700	14.53	109.5	68,000	13.13	90.3
Thrown .....pounds.	294,200	1.19	291,300	1.04	87.4	323,900	1.08	102.8
Spices:								
Cinnamon .....do..	1,835,000	0.05	1,712,700	0.05	100.0	1,967,700	0.04	80.0
Ginger .....cwt.	25,400	2.52	38,100	2.63	104.3	56,200	2.21	84.0
Pepper .....pounds.	24,267,800	0.02	31,700,300	0.02	100.0	27,970,400	0.03	150.0
Sugar:								
Refined .....do..	2,769,000	1.43	3,285,400	1.36	95.1	4,206,600	1.04	76.5
Unrefined .....do..	19,805,500	1.05	20,357,000	1.00	95.2	19,652,300	0.77	77.0
Molasses	209,600	0.43	371,300	0.41	95.3	411,000	0.35	85.3
Tallow and stearine	1,118,800	2.01	1,037,200	2.02	100.5	1,109,800	1.88	93.5
Tar.....barrels.	160,000	0.70	189,900	0.78	111.4	173,400	0.75	96.1
Teeth, elephants', &c.....cwt.	9,200	49.11	13,500	47.23	94.1	10,000	48.34	102.4
Tin, in blocks, ingots .....do.	487,600	5.22	525,700	4.68	89.6	522,700	4.05	86.5
Valonia ..... tons	35,500	14.75	30,800	15.94	108.1	34,400	15.30	95.9
Wine:								
Red .....gallons	9,052,500	0.24	9,169,700	0.26	108.3	8,817,100	0.25	96.1
White.....do..	6,690,900	0.46	6,451,300	0.47	102.1	6,321,400	0.48	102.1
Wood and timber..... loads.	2,018,400	2.61	2,142,600	2.61	100.0	1,953,000	2.49	95.4
Sawn or split.....do..	4,176,700	2.60	4,313,600	2.41	92.7	4,045,200	2.28	94.6
Staves.....do..	125,600	5.06	141,100	4.54	89.7	135,600	4.11	90.5
Mahogany.....tons.	36,000	9.74	49,700	9.87	101.3	62,300	9.03	91.4
Wool:								
Sheep and lamb's..pounds.	483,954,300	0.05	494,110,700	0.05	100.0	519,555,400	0.05	100.0
Alpaca, vicuna, llama..do..	4,051,700	0.06	1,517,900	0.06	100.0	7,883,000	0.06	100.0
Goats' wool or hair....do..	16,859,700	0.08	18,201,400	0.07	87.5	16,792,500	0.07	100.0
Woolen rags, to be used as wool..... .....pounds.	84,981,100	0.009	80,626,500	0.009	100.0	69,392,900	0.009	100.0
Woolen yarn, silk mixture.do..	12,728,800	0.12	14,553,100	0.12	100.0	13,840,200	0.12	100.0
Yeast, dried.....cwt.	217,700	2.67	260,600	2.80	104.8	281,700	2.76	98.2
Zinc:								
Crude, in cakes.....tons.	42,000	16.92	40,700	13.27	78.4	47,600	14.69	110.8
Manufactures of, unenumerated.....cwt.	363,300	1.09	407,000	1.00	91.7	402,700	0.97	97.0
Average.....	.....	.....	.....	.....	99.4	.....	.....	94.8

r.—DIVIDEND So MINING SHARES during the calendar year 1884.

of company.	No. of dividends.	Amount.
ion	1	$62,500
ing	2	50,000
	1	5,000
	4	117,500
Creek	1	11,250
nsolidated	6	269,265
King Consolida-		
	6	150,000
Consolidated	1	10,000
Blue Gravel	6	60,000
	13	271,200
Pleasant	1	15,000
nde	10	174,880
Eureka	2	123,947
h Consolidated	12	600,000
uttes	2	31,376
d Consolidated	3	75,000
te	6	60,000
	69	1,850,948
	5	82,500
	1	100,000
Consolidated	2	10,000
ia	1	31,500
te Hill	2	20,000
	1	80,000
ite	1	50,000
	1	10,000
rer	1	100,000
e Consolidated	1	20,000
hief	2	40,000
Star	1	25,000
	1	50,000
opes Consolida-		
	14	850,000
	34	1,419,000

Name of company.	No. of dividends.	Amount.
Dakota:		
Big Bend Hydraulic	12	$72,000
Father de Smet	10	200,000
Homestake	12	306,250
Total	34	578,250
Nevada:		
Jackson	2	10,000
Kentuck	8	24,000
Navajo	2	50,000
Paradise Valley	5	50,000
Richmond Consolidated	1	67,500
Total	18	201,500
Montana:		
Alice	3	150,000
Hecla Consolidated	13	195,000
Helena	1	36,000
Hope	3	36,000
Lexington	4	345,000
Montana	1	50,000
Moulton	3	80,000
Original	10	30,000
Total	38	922,000
Utah:		
Cosmopolitan	1	25,000
Eureka Hill	6	120,000
Honorine	1	12,500
Horn Silver	4	1,200,000
Ontario	12	900,000
Total	24	2,257,500
Vermont:		
Rooks	3	31,000
New Mexico:		
Sierra Bella	1	30,000
Sierra Grande	2	160,000
Total	3	190,000

XLVI.—*NAMES of the GOLD and SILVER MINES on which ASSESSMENTS have been LEVIED during the calendar year* 1884.

Name of mine.	Amount.	Name of mine.	Amount.
Acme Mill	$4,000	Jupiter D. Gravel	$10,000
Alaska	35,000	Justice	28,250
Alaska Mill	3,400	Lady Washington Consolidated	10,000
Alpha Consolidated	45,000	La Grange Hydraulic	5,000
Alpha Hydraulic	7,500	Lake Co. Quicksilver	6,250
Andes	27,500	Lewis Consolidated	3,000
Alta Consolidated	162,000	Loretto Mill	20,000
Argenta	10,000	Mammoth Bar	45,000
Aultman Mill	2,000	Marshall	3,000
Baker Divide	2,000	Martin White	34,500
Belmont	25,000	Massachusetts Consolidated	1,000
Belle Isle	35,000	Mayflower Gravel	32,500
Benton	48,000	Mexican	230,000
Best & Belcher	216,000	McElroy Gravel	3,000
Blue Bluff Gravel	2,000	Milton W. and Gravel	75,000
Bodie Consolidated	50,000	Morrell Consolidated	1,000
Bodie Tunnel	20,000	Mono	25,000
Bullion	25,000	Mono Lake Hydraulic	10,000
Butte Creek	2,000	Morgan	16,000
Caborca	15,000	Murchie	15,000
California	136,000	New Coso	4,000
Champion (Mono County)	15,000	New York Hill	30,000
Champion (Nevada County)	11,100	North Belle Isle	10,000
Christy	60,000	North Gould & Curry	27,500
Chollar	168,000	North Peer	2,000
Columbus Consolidated	25,000	Oleta	1,000
Consolidated Amador	15,000	Ophir	201,000
Consolidated Imperial	50,000	Overman	28,000
Consolidated Virginia	93,000	Pedro Consolidated	5,000
Consolidated California and Virginia	64,800	Peer	30,000
Copperopolis	5,000	Peerless	50,000
Crocker	25,000	Pinal Consolidated	10,000
Cueva Santa	30,000	Pittsburgh	25,000
Day	105,000	Pleasant Valley	10,000
Dayton	40,000	Potosi	140,000
Delaware	5,000	Rainbow	45,000
Diana	10,000	Red Hill Hydraulic	5,000
Eastern Quicksilver	5,000	Real de la Castillio	2,000
Eintracht Gravel	15,000	Santa Ana	3,000
El Capitan	3,000	S. Maguel and La Trin	50,000
Eldorado Consolidated	15,000	Savage	226,000
Eldorado S. Consolidated	80,000	Segregated Belcher	6,400
Elko Consolidated	30,000	Sierra Nevada	250,000
Enterprise Mill	3,000	Silver Hill	5,400
Equitable Tunnel	8,000	Scorpion	20,000
Eureka Consolidated	50,000	Solid Silver	5,000
Exchequer	20,000	Standard Consolidated	25,000
Excelsior Gravel	100,000	Starlight	6,000
Golden C. Drift	3,000	Sterling	1,000
Golden Fleece G	21,500	Summers Consolidated	2,500
Goodshaw	10,000	Summit	2,500
Gould & Curry	162,000	Telfair	2,000
Grand Prize	80,000	Tilden	5,000
Hale & Norcross	196,000	Tohongo	3,000
Head Center Consolidated	10,000	Union Consolidated	250,000
Holmes	100,000	Union Gravel	5,000
Humboldt Hill	3,000	Utah	70,000
Independence	40,000	Villagrana	2,000
Indian Springs D	14,000	Wall Street Quicksilver	9,000
Julia Consolidated	11,000	Wildman	2,500

Comparison with previous year.

State or Territory.	1883.	1884.
California	$1,196,044	$764,250
Nevada	4,244,490	3,632,950
Arizona	165,500	127,000
Utah	52,000	68,000
Dakota	10,000	.....
Alaska	20,250	3,400
Lower California	4,500	4,000
Total	5,692,784	4,609,700

'RODUCTION of GOLD and SILVER from the MINES of the STATE OF during the calendar year ended December 31, 1884, *compared with calendar*

Name of mine.	1883. Quantity of ore worked.		1884. Quantity of ore worked.	
	Tons.	Value.	Tons.	Value.
CHURCHILL COUNTY.				
and Mining Company	289	$1,451 99		
ELKO COUNTY.				
	185	15,022 00		
	700	25,200 00		
	646	55,815 06	1,970	$149,652 47
	2,693	430,457 80		
			331	26,741 88
			4,383	464,909 65
ld	4,224	526,495 76	6,684	641,304 00
ESMERALDA COUNTY.				
	696	12,930 37		
	615	80,961 49	556	27,936 43
	278	36,021 19		
	8,726	471,102 93		
			7,856	199,847 05
C. Company			3,343	83,072 05
	9,806	297,142 95		
ld	20,121	898,158 93	11,755	310,856 53
EUREKA COUNTY.				
	3,710	125,258 00	122	3,641 48
	113	5,896 50	123	4,681 01
	8	2,521 65	121	10,700 26
	1	32 38		
	2	141 27	30	1,515 56
			12	927 93
	8	1,549 28	24	6,070 86
	73	4,985 23	131	10,549 67
	88	4,310 29	61	3,623 92
			4	81 59
			3	199 26
r & Co			6,440	47,455 39
	1	29 07		
and Mining Company	17,449	214,928 70	3,211	29,031 17
	1	69,20	3	134 87
	2	70 36		
			3	48 71
	72	3,262 47	69	2,315 65
	7	191 49		
	7	217 91		
	1	95 34	10	257 51
	4	403 37		
	1	18 90		
	61	1,386 94	4	83 50
	3,186	33,793 68		
			3	65 03
			76	4,354 99
	1	50 31		
	3	80 77	74	2,013 39
	2	149 09		
	6	150 00		
			4	112 08
	37	2,065 22	14	1,550 00
	15	422 40		
			2	149 72
			2	91 33
			3	60 95
	111	8,881 24	50	1,861 13
	1	51 32		
			3	238 97
2	29	1,467 17	9	1,025 30
			21	898 77
			4	233 49
	584	8,375 02	1,240	12,450 00

XLVII.[48]—*PRODUCTION of GOLD and SILVER from the MINES of the STATE OF NEVADA*—Continued.

Name of mine.	1883.		1884.	
	Quantity of ore worked.		Quantity of ore worked.	
	Tons.	Value.	Tons.	Value.
EUREKA COUNTY—Continued.				
Enterprise, Prospect Mountain	6	$184 88		
Este	2	229 78	1	$54 26
Eureka Consolidated	9,512	205,564 45	12,520	375,813 39
Eureka Tunnel and Mining Company	1,529	74,055 48	335	15,649 27
Eureka Star	4	122 87	23	949 12
Evans	1	40 84		
Excelsior	10	166 10	23	2,111 54
Fandi	25	1,051 18		
Five Twenty	2	148 77	47	987 16
Fletcher	3	171 35		
Fourth of July	6	332 29	9	243 38
Franky Scott	1	24 40		
Frazer & Millard			30	690 33
Garrison	860	55,398 70	1,839	118,068 28
General Lee			340	7,155 61
General Shields			14	800 00
Giant			16	1,030 17
Gilmore	1	40 28	1	32 40
Golden Era			1	26 71
Goliath			7	323 09
Grant	46	2,352 62	63	3,064 60
Hamburg	471	18,245 45	803	28,114 37
Hartnett	3	127 34		
Herculean	216	3,552 27	15	284 04
Hillside			9	273 70
Horace Toney	5	115 65	5	159 18
Idaho	157	5,784 14	245	5,085 11
Industry	5	244 55	7	216 13
Ione	1	44 18		
Irish Ambassador	80	4,923 73	38	2,305 30
Irwin			9	497 63
Ivey & Co			5	115 26
Jackson	1,399	48,861 29	489	19,703 02
Kentuck	12	1,087 55		
King Lear			143	11,800 13
K. K. Furnace	60	1,043 77		
Lawson	1	11 08		
Little Mac	1	25 37		
Lone Pine			68	1,889 94
Macon City	9	592 42	25	2,877 49
Magnet	4	124 68		
Marguerita	9	618 42	123	4,296 68
Maria			40	2,678 81
May Day	1	108 41		
Medlin	1	21 69		
Members	273	3,608 92	415	7,085 97
Metamoras	17	405 59		
Mineral Hill	1	170 64		
Mortimer			164	5,018 59
Mountain Boy	4	551 20		
Mountaineer	3	111 76		
Mount Hope			76	1,255 62
McBride	16	439 33		
McCuen	23	497 15	2	35 28
McDonald	5	86 27		
McMannie	1	31 90		
Onondago	356	15,900 38		
Oriental and Belmont	28	697 95	73	2,498 26
Orange	2	28 62	19	1,155 59
Ozark	4	70 54		
Paul Pry	2	3,261 79	142	5,503 56
Pentier	3	109 64		
Phœnix	201	6,359 29	176	7,096 72
Piute	1	64 28	5	271 [illegible]
Pope			1	110 [illegible]
Prospect Mountain Tunnel	5	274 19		
Purcell	1	40 02		
Reeves & Berry			27	2,378 [illegible]
Red Bank			12	226 [illegible]
Republic	42	765 24	24	489 [illegible]
Reserve			115	6,055 75

XLVII.—*PRODUCTION of GOLD and SILVER from the MINES of the STATE OF NEVADA, &c.*—Continued.

Name of mine.	1883.		1884.	
	Quantity of ore worked.		Quantity of ore worked.	
	Tons.	Value.	Tons.	Value.
EUREKA COUNTY—Continued.				
Richmond Consolidated	7,783	$154,477 00		
Richmond of Nevada	10,488	286,273 11	34,194	$492,819 66
Rose	1	57 13	11	318 08
Ross	6	171 92		
Ruby and Dunderberg	3,667	92,860 14	2,297	73,249 36
San José	9	405 74	7	411 63
Scorpian			37	1,209 66
Silver Connor	242	8,799 83	869	28,931 69
Silver Lick	100	6,272 22	652	22,746 55
Silver Pick			281	14,520 08
Silver Reef	5	1,357 49	4	770 84
Silver Stone	4	117 70		
Silver West	4	142 43	55	1,744 36
Snow Cloud	1	21 71		
Spink			5	131 54
Smeet	4	145 47		
Tiger Lilly			57	1,318 33
Tyndall			5	225 47
Vegas	6	305 07		
Waters			24	310 33
Welsh & Evans			4	93 81
Western Globe			2	165 61
Williams	71	4,772 76	26	1,489 01
Winnepeg			3	105 54
Woodchopper	9	1,371 34	12	1,765 01
Wren	1	34 36		
X Y Z			4	289 93
Total	63,307	1,436,728 75	68,965	1,436,888 75
Tailings worked	6,668	178,565 64		
Total yield	69,975	1,615,294 39	68,965	1,436,888 75
HUMBOLDT COUNTY.				
Paradise Valley			5,016	195,737 61
Ross Milling and Mining Company			5,346	42,065 71
Ohio			17	3,870 00
Total			10,379	241,673 32
Tailings worked			910	14,127 27
Total yield			11,289	255,800 59
LANDER COUNTY.				
Breen	8	2,341 94		
Columbia			20	5,808 43
Great Eastern	22	3,818 13		
Lady of the Lake	87	8,386 79		
Lander & Paxton	985	158,126 20		
London	26	3,032 92		
Manhattan Silver Mining Company	1,972	490,924 87	3,532	666,605 24
Merced	16	5,862 18		
New Battle Mountain	376	25,306 70		
Patriot	139	40,070 15		
Plymouth	22	8,490 16		
Silver Wedge	309	84,164 49		
Silver Side	38	6,872 66		
San Francisco Tunnel	19	3,053 95		
Tribute	102	35,231 71		
Total yield	4,121	865,682 85	3,552	672,413 67
LINCOLN COUNTY.				
Alpa	5	419 75		
Bald Balk	1	110 90		
Black Jack			73	2,095 10
Bluett	4	298 90		
Bullionville Smelting Company	18,251	85,460 32		
Day Silver Mining Company			4,224	95,118 45
Fairview	2	191 25		

XLVII.—*PRODUCTION of GOLD and SILVER from the MINES of the STATE OF NEVADA, &c.*—Continued.

Name of mine.	1883. Quantity of ore worked. Tons.	1883. Value.	1884. Quantity of ore worked. Tons.	1884. Value.
LINCOLN COUNTY—Continued.				
Floral Mill				$578 4,072 61
Garrison	2	$265 25		
J. Powers	3	146 52		
John Purcher	3	378 00		
L. J. Mine	100	3,500 00		
Los Angeles	3	452 81		
Lucky Jim			12	378 84
May Flower	7	294 00		
Meadow Valley	52	1,955 00		
Morning Star	12	2,419 00		
Southwestern Mining Company	765	24,770 00	1,884	73,820 02
Techatticuk	618	23,815 95		
Wall Street			12	310 20
Washington and Creole	3	120 00		
Total	19,831	144,597 65	6,793	175,795 22
Tailings worked	17,209	109,803 47	100	100 00
Total yield	37,040	254,401 12	6,893	175,895 22
LYON COUNTY.				
C. C. Stevenson	302	6,057 23		
Lower Comstock Mining Company	60	1,200 00		
Solomberg Bros			886	16,410 7[illegible]
Total	362	7,257 23	886	16,410 7[illegible]
Tailings worked	58,466	165,091 33	78,381	254,230 5[illegible]
Total yield	58,828	172,348 56	79,267	270,641 3[illegible]
NYE COUNTY.				
Barcelona			389	12,663 [illegible]
Belmont	1,542	42,254 38	815	29,565 [illegible]
Blue Bell	108	9,834 12		
Downieville	422	21,177 18		
El Dorado			266	8,635 29
F. E. Osgood	3	359 99		
Good Hope	1	170 00		
Jefferson	560	15,477 00		
La Salle	1	162 81		
N. F. Leon	12	963 41		
Prussian	390	5,207 00		
Queen Elizabeth	4	1,114 41		
Q. Z. Mine			771	15,004 56
Reveille	12	1,582 24		
Silver Point	187	8,510 00	5	1,012 80
Trowbridge			12	1,074 94
Twin River	1,800	22,785 09		
Tybo Consolidated	1,700	60,525 00		
Unknown Mine	538	11,100 00		
Total yield	7,280	201,222 63	2,258	67,976 11
STOREY COUNTY.				
Andes	128	1,722 00		
Belcher	12,230	219,902 24	34,953	467,858 16
Caledonia			3,310	37,189 38
Challenge	1,059	14,026 88		
Chollar Potosi	22,058	292,708 32	14,062	161,187 55
Confidence	217	3,038 78		
Consolidated Imperial	554	7,794 75		
Consolidated Virginia and California			1,814	32,150 [illegible]
Crown Point	40,544	483,622 75	39,217	489,000 12
Gould & Curry			1,393	19,300 1[illegible]
Hale & Norcross			13,047	178,305 [illegible]
Kentuck	11,094	257,327 05	17,257	296,900 [illegible]
Kentuck, Imperial, and Challenge			932	15,259 [illegible]
Lady Bryan	1,680	9,760 00	1,372	8,124 [illegible]
Monte Christo	1,250	15,427 13	2,480	21,186 [illegible]

XLVII.—*PRODTCTION of GOLD and SILVER from the MINES of the STATE OF NEVADA, &c.*—Continued.

Name of mine.	1883. Quantity of ore worked.		1884. Quantity of ore worked.	
	Tons.	Value.	Tons.	Value.
STOREY COUNTY—Continued.				
Ophir	4,728	$45,040 40	3,679	$48,864 81
Savage	118	1,358 00	.....	.....
S. Huley	325	1,868 70	.....	.....
Union Consolidated	1,163	20,821 41	.....	.....
W. Rodda	300	2,700 00	.....	.....
W. Roe & Co	150	1,050 00	.....	.....
Yellow Jacket	29,556	445,105 43	54,716	784,652 59
Total	127,149	1,823,273 84	188,232	2,562,689 75
Tailings worked	1,653	5,920 98	7,806	35,171 53
Total yield	128,802	1,829,194 82	196,038	2,598,861 28
WASHOE COUNTY.				
Harris Mining Company	.....	.....	18	3,093 90
Total yield	.....	.....	18	3,093 90
WHITE PINE COUNTY.				
Argus	.....	.....	2,050	49,200 00
Bay State	1,935	39,247 48	142	5,647 70
Blue Bell	186	2,728 00	.....	.....
Exchequer	114	1,968 00	.....	.....
Fair Play	510	35,401 23	.....	.....
Fort Hayne and Credit	854	1,708 00	.....	.....
Monitor	1,875	66,187 50	2,295	76,967 00
Raymaster	2,112	109,091 05	.....	.....
Rescue	44	4,920 00	.....	.....
Stafford	300	10,897 60	.....	.....
Star	798	34,335 83	.....	.....
Sunrise	.....	.....	1,200	23,760 00
Total	9,228	306,484 69	5,687	156,264 70
Tailings worked	6,133	14,838 65	4,381	18,367 65
Total yield	15,361	321,323 34	10,068	174,632 35

XLVIII.—*TABLE showing the EXTENT of VEINS OWNED severally by the PROMINENT MINING COMPANIES now being operated in ARIZONA, CALIFORNIA, COLORADO, IDAHO, UTAH, &c., together with the NUMBER of SHARES, PAR VALUE, AMOUNT of CAPITAL STOCK, and AGGREGATE of ASSESSMENTS and DIVIDENDS of EACH COMPANY.*

[From the New York Mining Record.]

Name of company.	State.	Location of mine.	Feet in mine.	Shares.	Par value.	Capital.	Last assessment levied.	Number of assessments.	Total amount of assessment levied.	Last dividend.	Number of dividends.	Total amount of dividends disbursed.
Grand Central Mining Company	Ariz	Tombstone		100,000	$100	$10,000,000				Dec. —, 1882	16	$800,000
Silver King Mining Company	do	Pioneer district, Pinal County.	1,500	100,000	100	10,000,000			No assess't	Dec. 15, 1884	45	1,350,000
Tombstone Mill and Mining Company	do	Tombstone district, Pima County.	4,500	500,000	25	12,500,000	Not asses'ble.			Apr. 15, 1882	25	1,250,000
Vizina Consolidated Mining Company	do	Tombstone district		200,000	25	5,000,000				Nov. —, 1884	8	145,000
Contention Mining Company*	do			250,000	50	12,500,000				Dec. 24, 1884	20	1,187,500
Boston Consolidated Mining Company	Cal			100,000			Nov. 21, 1883	5	$120,000			None
Black Bear Quartz Gold Mining and Milling Company.	do	Black Bear Gulch, Siskiyou County.	4,500	100,000	30	3,000,000			15,000	Dec. 28, 1884	84	887,000
Bodie Consolidated Gold Mining Company.	do	Bodie	750	100,000	100	10,000,000	Dec. 21, 1883	4	200,000	Dec. 5, 1884	27	1,607,500
Bonanza King Mining Company	do	San Bernardino	8,600	100,000	10	1,000,000				Sept. 15, 1884	7	175,000
Bulwer Consolidated Mining Company	do	Bodie	3,000	100,000	100	10,000,000	Dec. 12, 1877	1	30,000	Jan. 31, 1884	19	175,000
Derbec Blue Gravel Mining Company	do			100,000						Oct. 9, 1884	6	60,000
Excelsior Water and Mining Company	do	Smartville, Yuba County†	521	100,000	100	10,000,000	Sept. 2, 1884	7	310,000	Oct. 6, 1880	31	875,000
Empire Gold Mining Company	do	Grass Valley, Nevada County.	3,600	20,000	100	2,000,000	Aug. 5, 1871		40,000	June 15, 1878	16	110,000
Fresno Enterprise Mining Company	do	Fresno County	1,500	100,000	50	5,000,000				July 7, 1882	5	110,000
Great Mountain Gold Mining Company.	do	Plumas County		125,000	10	1,250,000				Nov. 26, 1881	29	212,375
Idaho Mining Company	do	Grass Valley, Nevada County.		3,100	100	310,000	None			Dec. 15, 1884	179	3,620,800
Isabella Gold Mining Company	do	Mogul district, Alpine County.		150,000	5							
Mono Mining Company	do	Bodie district	750	50,000	100	5,000,000	July 8, 1884	21	172,500			None.
Mount Pleasant Mining Company	do			150,000	1	150,000				Mar. 31, 1884	5	105,000
North Bloomfield Gravel Mining Company.	do	North Bloomfield, Nevada County.†	1,800	45,000	100	4,500,000	June 23, 1881	44	1,590,000	Nov. 5, 1880	16	225,000
New York Hill Gold Mining Company	do	Grass Valley, Nevada County.		50,000	100	5,000,000	July 29, 1884	8	75,000	Aug. 10, 1882	21	215,000
Plymouth Consolidated Mining Company.	do	Plymouth, Amador County	4,800	100,000	50	5,000,000				Dec. 5, 1881	19	950,000
Pleasant Valley Mining Company	do			100,000	100	10,000,000	Mar. 3, 1884	3	40,000	Dec. 15, 1882	4	40,000

pany.												
Sierra Buttes Gold Mining Company	.. do	Sierra Buttes, Sierra Nevada County.	.....	22, 500	10	225, 000	.....	....	Paid up..	Oct. 10, 1884	....	1, 375, 352
Spring Valley Hydraulic Mining Company.	.. do	.....	.....	200, 000	1	200, 000	.....	....	.....	Jan. 5, 1881	....	50, 000
Standard Consolidated	...do	Bodie district	.....	100, 000	100	10, 000, 000	Oct. 17, 1884	1	25, 000	Mar. 12, 1884	80	4, 450, 000
Syndicate Mining Company	...do	.....do	1, 500	100, 000	100	10, 000, 000	July 19, 1882	4	40, 000	Nov. 6, 1884	6	60, 000
Yuba Gold Mining Company	...do	.....	.....	.....	...	.....	Oct. 23, 1882	11	.....	Sept. —, 1881	2	8, 000
Adams Mining Company	Colo ...	Leadville	.....	150, 000	10	1, 500, 000	.....	....	.....	Dec. 20, 1884	6	82, 500
Amie Consolidated Mining Company	...do	.....do	.....	500, 000	10	5, 000, 000	Not asses'ble.	....	.....	Oct. 2, 1883	7	330, 000
Bassick Mining Company	...do	Rosita, Custer County	.....	100, 000	100	10, 000, 000	.....	....	.....	Mar. 5, 1884	5	425, 000
Bobtail Gold Mining Company	...do	Gilpin County	2, 266	227, 326	5	1, 136, 630	Not asses'ble.	....	None	Mar. 30, 1880	4	147, 161
Bobtail Tunnel Company	...do	.....do	.....	20, 000	5	100, 000	July 7, 1883	....	52, 000	Dec. 15, 1879	4	72, 000
California Gold Mining Company	...do	.....do	.....	130, 000	...	.....	.....	....	.....	Aug. 13, 1883	2	65, 000
Catalpa Mining Company	...do	Leadville	.....	300, 000	10	3, 000, 000	Not asses'ble.	....	.....	June 16, 1884	6	270, 000
Climax Silver Mining Company	...do	.....do	.....	200, 000	10	2, 000, 000	....do	....	.....	Aug. 20, 1880	5	180, 000
Carbonate Hill Mining Company	...do	.....	.....	200, 000	10	2, 000, 000	....do	....	.....	Apr. 1, 1884	8	80, 000
Chrysolite Mining Company	.. do	Leadville	.....	200, 000	50	10, 000, 000	....do	....	.....	Dec. 20, 1884	12	1, 650, 000
Colorado Consolidated Mining Company.	...do	Georgetown district, Clear Creek County.	.....	65, 000	25	1, 625, 000	....do	....	Paid up..	July —, 1875	....	251, 875
Colorado United Mining Company	...do	Clear Creek County	.....	65, 000	25	1, 625, 000	....do	....	.....	.....	....	.....
Consolidated Hercules and Roe Silver Mining Company.	.. do	Griffith district, Clear Creek County.	16, 500	100, 000	10	1, 000, 000	....do	....	None	Jan. —, 1876	....	12, 000
Dean Mining and Placer Company	...do	.....	.....	100, 000	...	.....	....do	....	.....	Dec. 1, 1882	1	50, 000
Dunderburg Silver Mining Company	...do ...	Georgetown, Clear Creek County.	.....	150, 000	10	1, 500, 000	....do	....	.....	.....	....	None.
Dunkin Mining Company	...do	Leadville	.....	200, 000	25	5, 000, 000	....do	....	.....	Sept. 15, 1884	17	220, 212
Evening Star Mining Company	...do	.....do	.....	50, 000	10	500, 000	....do	....	.....	Oct. 25, 1883	56	1, 400, 000
Freeland Mining Company	...do	Idaho Springs, Clear Creek County.	5, 000	200, 000	25	5, 000, 000	....do	....	.....	May 20, 1880	....	50, 000
Glass-Pendery Consolidated Mining Company.	...do	Leadville	.....	250, 000	20	5, 000, 000	....do	....	.....	Apr. 8, 1881	1	25, 000
Highland Chief Consolidated Mining Company.	...do	Leadville district	.....	50, 000	50	2, 500, 000	....do	....	.....	.....	21	210, 000
Iron Silver Mining Company	...do	Leadville	.....	500, 000	20	10, 000, 000	....do	....	.....	Jan. 9, 1884	13	1, 320, 000
Leadville Consolidated Mining Company.	...do	California district, Lake County.	1, 500	400, 000	10	4, 000, 000	....do	....	.....	Sept. 29, 1884	19	390, 000
Little Chief Mining Company	...do	Leadville	.....	200, 000	50	10, 000, 000	....do	....	.....	May 30, 1884	10	760, 000
Little Pittsburg Mining Company	...do	.....do	.....	200, 000	100	20, 000, 000	....do	....	.....	Mar. 1, 1880	10	1, 050, 000
La Plata Mining and Smelting Company.	...do	.....do	.....	200, 000	10	2, 000, 000	... do	....	.....	Oct. 2, 1882	35	610, 000
London Gold and Silver Mining Company.	...do	Park County	.....	500, 000	....	.....	....do	....	.....	.....	....	.....
Moose Mining Company	...do	Boulder Gulch, Park County	2, 025	200, 000	10	2, 000, 000	....do	....	.....	Mar. 15, 1878	11	550, 000
Morning Star Consolidated Mining Company.	...do	Leadville	.....	100, 000	10	1, 000, 000	... do	....	.....	July 1, 1884	20	740, 000

* This company and the Western up to December 10, 1881, paid $1,475,000.

† Acres.

XLVIII.—*TABLE showing the EXTENT of VEINS OWNED severally by the PROMINENT MINING COMPANIES now being operated in ARIZONA, CALIFORNIA, COLORADO, IDAHO, UTAH, &c.*—Continued.

Name of company.	State.	Location of mine.	Feet in mine.	Shares.	Par value.	Capital.	Last assessment levied.	Number of assessments.	Total amount of assessment levied.	Last dividend.	Number of dividends.	Total amount of dividends disbursed.
Prussian Mining and Milling Company.	Colo			150,000	$10	$1,500,000	Not asses'ble.			Jan. 15, 1883	10	$132,000
Robinson Consolidated Mining Company	do	Ten-Mile district		200,000	50	10,000,000	do			Nov. 15, 1881	12	700,000
Small Hopes Mining Company	do	Leadville		250,000	20	5,000,000	do			Dec. 6, 1884	16	800,000
Silver Cord Silver Mining Company	do	do		500,000	10	5,000,000				Nov. 1, 1883	3	225,000
Smuggler Consolidated Mining Company.	do			60,000						Aug. —, 1883	10	66,700
United Gregory Mining Company	do	Gilpin County		300,000	1	300,000				Apr. 1, 1883	3	38,250
Silver King Mining Company	do	Montezuma district		500,000	2	1,000,000	Not asses'ble.			Aug. 19, 1881	1	50,000
Big Bend Hydraulic Mining Company	Dak			200,000	5	1,000,000	do			Dec. 5, 1884	19	114,000
Caledonia Gold Mining Company	do	Whitewood district	1,500	100,000	100	10,000,000	Oct. 31, 1883	14	$490,000			114,000
Deadwood-Terra Gold Mining Company.	do	Whitewood district (consolidated December, 1880).		200,000	25	5,000,000		2		Jan. 20, 1883	26	900,000
Father De Smet	do	Whitewood	1,500	100,000	100	10,000,000	Nov. 13, 1878	6	200,000	Dec. 31, 1884	40	920,000
Giant and Old Abe Mining Company	do	do		100,000	100	10,000,000	Sept. 3, 1881	2	300,000			None.
Homestake Mining Company	do	Whitewood, Lawrence County.	1,500	125,000	100	12,500,000	Apr. 8, 1878		200,000	Nov. 25, 1884	74	2,512,500
Consolidated Gold Mining Company	Ga	Georgia		100,000	5	500,000				Dec. 20, 1883	29	110,000
Holyoke Mining Company	Idaho			200,000						Nov. 19, 1883	14	58,000
Castle Creek Gold (Placer) Mining Company.	do			100,000	1	100,000				Nov. 16, 1883	18	55,000
Alice Gold and Silver Mining Company.	Mont	Butte district, Montana		400,000	25	10,000,000	Not asses'ble.			Dec. 1, 1884	13	550,000
Boston and Montana Gold Mining Company.	do			200,000	10	2,000,000				Jan. 10, 1883	17	310,000
Hecla Consolidated Mining Company.	do			30,000	50	1,500,000				Nov. 1, 1884		717,500
Moulton Mining Company	do	Butte		400,000						Dec. 10, 1884	3	80,000
Granite Mountain	do	Flint Creek mining district	15,891	400,000	25	10,000,000						
Original Mining Company	do	Butte		60,000	25	1,500,000				Oct. 1, 1884	38	114,000
Lexington Mining Company	do	do								June 23, 1884		565,000
Hope Mining Company	do	Flint Creek mining district	28,913	8,000						Oct. 1, 1884	12	158,251
Sierra Grande Mining Company	N. Mex	Lake Valley district		400,000						Sept. 5, 1884	9	360,000
Sierra Bella Mining Company	do			200,000	25	5,000,000	Not asses'ble.			May 1, 1884	1	30,000
Socorro Mining and Milling Company	do	Socorro district		2,500	100	250,000				Mar. 15, 1882	2	4,000
Gold Hill Mining Company	do			140,000	5	700,000						
Meever Hill	do			120,000	5	600,000						

Company.											
Christy Mill and Mining Company	do	do	10,000	60,000	100	6,000,000	Mar. 19, 1884	60,000	Feb. 9, 1883	15	90,000
Cosmopolitan Mining Company	do			100,000					Apr. 3, 1884	3	75,000
Frisco Mining and Milling Company	do	San Francisco district, Beaver County.									
Crescent Mining Company	do	Park City district		600,000					Oct. 25, 1883	4	150,000
Horn Silver Mining Company	do	San Francisco district, Beaver County.	1,400	400,000	25	10,000,000	Not asses'ble.		Nov. 15, 1884	15	4,000,000
New Emma Mining Company	do	Little Cottonwood district		78,500	100	7,850,000	do				
Ontario	do	Park City district	3,000	150,000	100	15,000,000			Dec. 31, 1884	10	26,050,000
Stormont Silver Mining Company	do	Silver Reef district		200,000	1	200,000			Nov. 1, 1881	5	155,000
Rooks Mining Company	Vt			50,000	10	500,000			Oct. 25, 1884	3	31,000

‡ The Deadwood previous to consolidation with Terra had paid $275,000 in dividends, while the Terra had paid $75,000.
§ Increased from 20,000 to 40,000 shares April 22, 1882.

XLIX.—*TABLE showing the EXTENT of VEINS OWNED SEVERALLY by a NUMBER of the PROMINENT MINING COMPANIES of NEVADA, together with the NUMBER of SHARES, PAR VALUE, AMOUNT of CAPITAL STOCK, and AGGREGATE of ASSESSMENTS and DIVIDENDS of EACH COMPANY.*

[From the New York Mining Record.]

Name of company.	Location of mine.	Linear feet in mine.	Shares.	Par value.	Capital.	Last assessment levied.	Number of assessments.	Total amount of assessment levied.	Last dividend.	Number of dividends.	Total amount of dividends disbursed.
Albion Consolidated Mining Company	Eureka district	6,000	150,000	$100	$15,000,000	July 17, 1883	14	$540,000			None.
Alexander Mining Company	Grantsville, Nye County	4,500	50,000	100	5,000,000	June 20, 1883	2	200,000	Jan. 1, 1882	1	$100,000
Alpha Consolidated Gold and Silver Mining Company.	Gold Hill district, Comstock lode	306	30,000	100	3,000,000	July 16, 1884	18	450,000			None.
Alta Silver Mining Company	do	600	108,000	100	10,800,000	Dec. 4, 1884	31	1,834,600			Do.
American Flag Mining Company	Ely district, Lincoln County	2,000	40,000	100	4,000,000	June 28, 1877	10	280,000			Do.
Andes Silver Mining Company	Virginia district, Comstock lode	2,000	100,000	100	10,000,000	Sept. 23, 1884	25	762,500			Do.
Argenta Mining Company	Tuscarora, Elko County	1,500	100,000	100	10,000,000	Apr. 16, 1884	17	325,000	Feb. 26, 1880	2	40,000
Baltimore Consol	Gold Hill district, Comstock lode	1,050	84,000	100	8,400,000	Apr. 30, 1879	19	1,037,500			None.
Belcher Silver Mining Company	do	1,040	104,000	100	10,400,000	Apr. 21, 1883	32	2,630,000	Apr. 10, 1876	38	15,397,200
Belle Isle Mining Company	Tuscarora district, Elko County	1,500	100,000	100	10,000,000	Mar. 12, 1884	7	120,000	Dec. 5, 1879	6	300,000
Belmont (Monitor) Mining Company	Philadelphia, Nye County	3,500	50,000	100	5,000,000	Nov. 8, 1884	38	805,000			None.
Best & Belcher Mining Company	Virginia district, Comstock lode	540	100,000	100	10,000,000	Nov. 21, 1884	31	1,643,390			Do.
Bristol Silver Mining Company			7,006	25	200,000	Non-assess'ble			Feb. 1, 1882	1	14,012
Buckeye	Devil's Gate, Lyon County	3,000	48,000	100	4,800,000	Nov. 25, 1878	19	332,000			None.
Bullion Mining Company	Gold Hill district, Comstock lode	943	100,000	100	10,000,000	May 19, 1884	72	4,445,000			Do.
Cabinet Mining Company	do					Oct. 8, 1877		4,000			Do.
Caledonia Silver Mining Company	do	2,188	100,000	100	10,000,000	June 15, 1883	39	2,730,000			Do.
Cherry Creek	Cherry Creek, White Pine County	1,000	30,000	100	3,000,000	Jan. 10, 1877	8	63,000			Do.
Chollar Mining Company*	Virginia district, Comstock lode	700	112,000	100	11,200,000	Oct. 29, 1884	15	801,000	Feb. 10, 1872	44	3,080,000
Consolidated California and Virginia	Comstock lode		216,000			Nov. 5, 1884	1	64,800			
Combination Mining Company	Black Mountain, Esmeralda County					May 18, 1878	2	20,000			None.
Consolidated Imperial Mining Company	Virginia district, Comstock lode	468	508,000	100	50,000,000	Sept. 1, 1884	21	1,502,000			Do.
Confidence Silver mining Company	Gold Hill district, Comstock lode	130	24,960	100	2,496,000	Feb. 12, 1881	12	268,800	May 1, 1865	6	78,000
Cosmopolitan Mining Company	do	1,800	100,000	100	10,000,000	Oct. 11, 1877	5	125,000	None		None.
Crown Point Gold and Silver Mining Company.	do	600	100,000	100	10,000,000	Feb. 16, 1882	47	2,673,370	Jan. 12, 1875	50	11,688,000
Day Silver Mining Company	Jack Rabbit district, Lincoln County		100,000	100	10,000,000	Sept. 26, 1884	15	375,000			None.
Dayton Gold and Silver Mining Company.	Devil's Gate, Lyon County	1,600	100,000	100	10,000,000	May 2, 1884	12	790,000			Do.
De Frees Mill and Mining Company	Tuscarora, Elko County	1,500	50,000	100	5,000,000	July 21, 1880	11	162,500			Do.
Eberhardt and Aurora	White Pine County		23,500	50	1,175,000				Dec. —, 1877		174,500
El Dorado Southern Consolidated	Philadelphia district, Nye County	2,600	40,000	100	4,000,000	July 14, 1884	14	647,000			None.
Eureka Consolidated Mining Company	Ruby Hill, Eureka County	1,680	50,000	100	5,000,000	Jan. 15, 1885	7	350,000	July 27, 1883	75	4,317,500

pany.	Comstock lode	400	100, 000	100	10, 000, 000	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Fairfax Mining Company	do	800	100, 000	100	10, 000, 000	July 19, 1882	3	46, 000				Do.
Florida	American Flat	1, 200	50, 000	100	5, 000, 000	Feb. 14, 1877	8	225, 000				Do.
General Lee	White Pine County	1, 000	10, 000	100	1, 000, 000	Oct. 23, 1882	6	307, 100				Do.
General Thomas	Columbus, Esmeralda County	2, 100	50, 000	100	5, 000, 000	July 20, 1880	6	125, 000				Do.
Geneva Consolidated Silver Mining Company.	Cherry Creek, White Pine County	3, 000	50, 000	100	5, 000, 000	Mar. 6, 1876	7	82, 500				Do.
Gila	Reveille, Nye County	1, 500	100, 000	100	10, 000, 000	July 22, 1881	8	195, 600	Aug. 16, 1875	2		50, 000
Glasgow Gold and Silver Mining Company.	Devil's Gate, Lyon County	1, 500	90, 000	100	9, 000, 000	Feb. 11, 1878	5	45, 000				None.
Globe Consolidated	Storey County	4, 300	38, 000	100	3, 800, 000	Mar. 29, 1879	11	222, 300				Do.
Gould & Curry Silver Mining Company.	Virginia district, Comstock lode	612	108, 000	100	10, 800, 000	Oct. 25, 1884	49	3, 770, 000	Oct. 10, 1870	36		3, 825, 800
Grand Prize	Tuscarora, Elko County	1, 500	100, 000	100	10, 000, 000	Nov. 24, 1884	17	575, 000	Sept. 16, 1880	6		450, 000
Hale & Norcross Silver Mining Company.	Virginia district, Comstock lode	400	112, 000	100	11, 200, 000	May 10, 1884	82	4, 426, 000	Apr. 10, 1871	36		1, 598, 000
Hamburg Mining Company	Eureka district	2, 000	100, 000	100	10, 000, 000	May 24, 1883	8	340, 000				None.
Hillside Mining and Milling Company	Bristol, Lincoln County	5, 000	100, 000	100	10, 000, 000	July 20, 1881	5	310, 000				Do.
Highbridge Silver Mining Company	Philadelphia district, Nye County	6, 000	100, 000	100	10, 000, 000	June 23, 1880	1	30, 000				Do.
Hornet Mining Company	Tuscarora	1, 500	100, 000	100	10, 000, 000	Jan. 30, 1878	3	30, 000				Do.
Hussey	Cornucopia, Elko County	4, 500	100, 000	100	10, 000, 000	Aug. 25, 1879	9	131, 000				Do.
Independence Mining Company	Tuscarora, Elko County	1, 500	100, 000	100	10, 000, 000	Mar. 12, 1884	13	280, 000	Sept. 22, 1879	9		225, 000
Indian Queen Mining and Milling Company.	Oneota, Esmeralda County	1, 000	125, 000	2	250, 000	Feb. 11, 1880	3	12, 000	Dec. 20, 1882	31		374, 000
Jackson	Eureka		50, 000	100	5, 000, 000	Nov. 23, 1880	13	262, 500	Jan. 4, 1884	2		10, 000
Jefferson	Jefferson, Nye County	8, 182	50, 000	100	5, 000, 000	Apr. 13, 1877	4	112, 000	May 15, 1875			50, 000
Julia Consolidated Mining Company	Virginia district, Comstock lode	3, 000	110, 000	100	11, 000, 000	Jan. 3, 1884	19	1, 479, 500				None.
Justice Mining Company	Gold Hill district, Comstock lode	2, 100	105, 000	100	10, 500, 000	Sept. 11, 1884	41	3, 424, 250				Do.
Kentuck Mining Company	Comstock lode	95	30, 000	100	3, 000, 000	Nov. 23, 1881	17	342, 000	Aug. 20, 1884	49		1, 200, 000
Knickerbocker	American Flat	2, 200	100, 000	100	10, 000, 000	Sept. 27, 1877	19	511, 000	None			None.
Kossuth Mining Company	Devil's Gate, Lyon County	2, 700	108, 000	50	5, 400, 000	Aug. 31, 1877	8	437, 400				Do.
Leopard Mining Company	Cornucopia, Elko County	1, 500	50, 000	100	5, 000, 000	Apr. 5, 1880	13	247, 500	Dec. 11, 1876	6		162, 500
Leviathan	Gold Hill district, Comstock lode	2, 000	100, 000	100	10, 000, 000	Sept. 29, 1882	13	380, 000				None.
Manhattan	Austin, Lander County	129, 810	50, 000	100	5, 000, 000	July 16, 1879	3	150, 000	Feb. 1, 1877	8		400, 000
Mackey Mining Company	Storey County	2, 400	100, 000	100	10, 000, 000	Nov. 23, 1880	5	70, 000				None.
Meadow Valley	Ely district, Lincoln County		60, 000	100	6, 000, 000	Aug. 1, 1881	16	528, 000	June 16, 1873	17		1, 260, 000
Mexican Gold and Silver Mining Company.	Virginia district, Comstock lode	600	108, 000	100	10, 800, 000	Nov. 11, 1884	28	2, 509, 000				None.
Martin White Mining Company	Ward district, White Pine County	22, 900	100, 000	100	10, 000, 000	July 25, 1884	18	1, 075, 000	June 27, 1879	2		60, 000
Mint Gold and Silver Mining Company	Virginia district, Comstock lode	6, 200	50, 000	100	5, 000, 000	July 28, 1880	24	165, 000				
Monitor Belmont	Belmont, Nye County	1, 400	30, 000	100	3, 000, 000	Aug. 8, 1877		162, 500	Dec. 5, 1873	3		75, 000
Mount Potosi Consolidated	Columbus district		100, 000	100	10, 000, 000	Sept. 27, 1883	10	225, 000				None.
Mount Diablo	Candelaria district	1, 400	50, 000	100	5, 000, 000	June 22, 1880	3	137, 500	Nov. 26, 1884	4		50, 000
Navajo Mining Company	Tuscarora, Elko County	1, 500	100, 000	100	10, 000, 000	Mar. 7, 1882	10	255, 000	Dec. 12, 1884	11		275, 000
Newark Gold and Silver Mining Company.	Ely district, Lincoln County	800	32, 000	100	3, 200, 000	Mar. 13, 1878	14	312, 000				None.
New York Mining Company	Gold Hill district, Comstock lode	1, 000	100, 000	100	10, 000, 000	Nov. 14, 1882	29	990, 000				Do.
Niagara Gold and Silver Mining Company.	do	1, 500	60, 000	100	6, 000, 000	Apr. 1, 1882	6	117, 000				Do.
North Bonanza	Flowery district, Comstock lode		100, 000	100	10, 000, 000	June 30, 1880	6	200, 000				Do.
Northern Belle Mining and Milling Company.	Candelaria, Esmeralda County	1, 600	50, 000	100	5, 000, 000	Jan. 30, 1884	2	425, 000	Apr. 16, 1883	71		2, 512, 500

Table showing the extent of veins owned severally by a number of the prominent mining companies of Nevada, &c.—Continued.

Name of company.	Location of mine.	Linear feet in mine.	Shares.	Par value.	Capital.	Last assessment levied.	Number of assessments.	Total amount of assessment levied.	Last dividend.	Number of dividends.	Total amount of dividends disbursed.
North Belle Isle Mining Company	Tuscarora district	.....	100,000	$100	$10,000,000	Jan. 3, 1884	7	$105,000	Aug. 19, 1881	2	$30,000
Occidental Mining Company	Comstock lode	1,006	40,000	100	4,000,000	Mar. 9, 1879	6	112,500	.....	.....	.....
Ophir Silver Mining Company	Virginia district, Comstock lode	675	100,800	100	10,000,800	Nov. 12, 1884	48	3,803,600	Jan. 17, 1880	23	1,506,400
Original Hidden Treasure	Treasure Hill, White Pine County	.....	21,333	100	2,133,000	Oct. 12, 1874	11	330,061	.....	....	31,999
Overman Gold and Silver Mining Company.	Gold Hill district, Comstock lode	1,200	115,200	100	11,520,000	Dec. 22, 1884	54	3,633,500	.....	....	None.
Phil Sheridan	Virginia district, Comstock lode	1,200	100,000	100	10,000,000	Nov. 3, 1882	12	180,000	.....	....	Do.
Paradise Valley Mining Company	Humboldt County	.....	100,000	100	10,000,000	Mar. 6, 1882	3	47,000	Oct. 29, 1884	5	50,000
Phœnix Silver Mining Company	Eureka district	600	50,000	100	5,000,000	May 9, 1881	23	457,500	.....	....	None.
Pioche	Pioche, Lincoln County	1,000	20,000	100	2,000,000	Oct. 5, 1876	14	260,000	Aug. 5, 1872	3	60,000
Potosi Mining Company	Virginia district, Comstock lode	700	112,000	100	11,200,000	July 29, 1884	16	750,000	.....	..	None.
Prospect Mining Company	Storey County	1,060	100,000	100	10,000,000	Sept. 5, 1882	9	300,000	.....	....	Do.
Raymond & Ely Mining Company	Meadow Valley, Lincoln	5,000	112,000	100	11,200,000	Aug. 27, 1880	16	955,000	Sept. 10, 1873	23	3,075,000
Real del Monte Mining Company	Esmeralda County	3,000	100,000	100	10,000,000	Nov. 17, 1882	16	515,000	.....	....	None.
Red Cross Mining Company	Storey County	1,300	100,000	100	10,000,000	.....	.....	None.	.....	....	Do.
Rescue	Prospect Hill, Eureka County	1,500	100,000	10	1,000,000	.....	.....	.....	.....	....	Do.
Richmond Consolidated	Ruby Hill, Eureka district	.....	54,000	25	1,350,000	.....	.....	.....	Dec. 2, 1884	37	3,042,387
Rock Island Gold and Silver Mining Company.	Gold Hill district, Comstock lode	1,200	100,000	100	10,000,000	Jan. 9, 1878	13	365,000	.....	....	None.
Santiago Mining Company	Devil's Gate, Lyon County	2,000	112,000	100	11,200,000	.....	.....	.....	June 11, 1869	....	Do.
Savage Gold and Silver Mining Company.	Virginia district, Comstock lode	800	112,000	100	11,200,000	Nov. 11, 1884	61	5,876,000	June 11, 1869	52	4,560,000
Segregated Belcher Mining Company	Gold Hill district, Comstock lode	160	6,400	100	640,000	May 9, 1884	22	302,400	.....	....	None.
Segregated Silver Mining Company	.....do	160	6,400	100	640,000	Jan. 12, 1876	....	12,000	.....	....	Do.
Sierra Nevada Silver Mining Company	Virginia district, Comstock lode	3,600	100,000	100	10,000,000	Oct. 22, 1884	80	5,650,000	Jan. 16, 1871	11	102,500
Silver City Mining Company	Gold Hill district, Comstock lode	3,800	63,100	100	6,310,000	May 2, 1881	2	6,310	.....	....	None.
Silver Hill Mining Company	.....do	4,000	108,000	100	10,800,000	June 2, 1884	20	1,825,200	.....	....	Do.
South Barcelona	.....	1,500	60,000	100	6,000,000	Aug. 15, 1879	5	114,000	.....	...	Do.
South Comstock Gold and Silver Mining Company.	Gold Hill district, Comstock lode	636	100,100	100	10,000,000	Sept. 9, 1879	6	79,000	.....	....	Do.
South California Silver Mining Company	.....do	1,500	50,000	100	5,000,000	Feb. 16, 1877	1	10,000	.....	.	Do.
Star Mining Company	Cherry Creek, White Pine County	1,500	100,000	100	10,000,000	Oct. 15, 1883	14	240,000	.....	.	Do.
Starr-Grove Silver Mining Company	Lewis district	.....	200,000	10	2,000,000	.....	.....	.....	June 30, 1881	8	160,000
Succor Mill and Mining Company	Gold Hill district, Comstock lode	3,800	68,400	100	6,840,000	Aug. 30, 1879	24	763,800	Oct. 16, 1871	2	22,800

West Comstock Gold and Silver Mining Company.	Virginia district, Comstock lode	8,000	100,000	100	10,000,000	Sept. 10, 1876		25,000			Do.
White Cross Mining Company	Storey County	650	100,000	100	10,000,000			None.			Do.
Woodville	Gold Hill district, Comstock lode	700	120,000	100	12,000,000	Jan. 23, 1878	6	3,030,000			Do.
Yellow Jacket Silver Mining Company	do	957	120,000	100	12,000,000	Feb. 7, 1882	44	5,358,000	Aug. 10, 1871	25	2,184,000

* Is part of the Chollar Potosi Company, that had been previously assessed $1,730,000, and had paid $3,060, on forty-four dividends.

L.—*SHIPMENTS of BULLION containing GOLD and SILVER via CENTRAL and SOUTHERN PACIFIC RAILROADS during the calendar year* 1884.

Consignees.	Locality to which shipped.				Total.
	Arizona.	California.	Nevada.	New Mexico.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*
San Francisco, Cal	350	106	1,814	.....	2,270
San Pedro, Cal	690	.....	.....	.....	690
Kansas City Smelting and Refining Works	361	.....	.....	.....	361
Kansas Smelting and Refining Company	70	.....	.....	.....	70
Aurora Sand Refining Company	326	.....	.....	.....	326
Balbach & Son, New Jersey	31	.....	.....	.....	31
Melrose, Cal	.....	.....	180	.....	180
Omaha and Grant Smelting Works	.....	.....	42	.....	42
Saint Louis Smelting and Refining Company	.....	.....	.....	10	10
Total	2,437	106	2,036	10	4,589

LI.—*SHIPMENTS of ORE containing GOLD and SILVER via CENTRAL and SOUTHERN PACIFIC RAILROADS during the calendar year* 1884.

Consignees.	Locality to which shipped.					Total.
	California.	Nevada.	Arizona.	New Mexico.	Other States and Territories.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
San Francisco	334	206	13	1	.....	554
Daggett	13	.....	.....	.....	.....	13
Melrose	322	10	.....	.....	773	1,105
Ione	22	.....	.....	.....	.....	22
Sutter Creek	3	.....	.....	.....	.....	3
Benson	11	.....	139	2,969	.....	3,119
Selby Smelting Works	87	530	1	.....	10	628
Pueblo Smelting Works	72	43	916	179	.....	1,210
Salt Lake, Utah	26	509	.....	.....	9	544
Nevada City	31	.....	.....	.....	.....	31
Boston & Colorado Smelting Works	195	39	23	126	.....	383
Palisade	.....	388	.....	.....	.....	388
Needles, Cal	14	22	.....	.....	.....	36
Omaha and Grant Smelting Works	.....	135	482	.....	.....	617
Mill City	.....	240	.....	.....	.....	240
Wells, Fargo & Co.'s Bank	.....	119	.....	.....	.....	119
Billings Smelting Works	.....	.....	1,049	1,719	.....	2,768
Kingston	.....	.....	.....	80	.....	80
Tucson	.....	.....	12	.....	.....	12
Socorro	.....	.....	87	.....	.....	87
Other consignees	46	427	420	.....	12	905
Total	1,176	2,668	3,142	5,094	804	12,884

LII.—*SHIPMENTS of BULLION containing GOLD or SILVER via the ATCHISON, TOPEKA and SANTA FE RAILROAD from NEW MEXICO for the calendar year* 1884.

Localities from which shipped.	To whom consigned.							Total.
	Kansas City Smelting and Refining Company.	Pennsylvania Lead Company.	Aurora Smelting and Refining Company.	Omaha and Grant Smelting and Refining Company.	Billings smelter.	Benson smelter.	Other smelters.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Bernalillo	.....	.....	.....	.....	.....	.....	10	10
Deming	47	28	.....	45	12	.....	.....	127
Las Cruces	.....	.....	.....	.....	.....	.....	27	27
Lake Valley	.....	298	.....	.....	10	.....	41	349
Socorro	2,651	681	1,431	79	.....	12	30	4,808
Silver City	.....	.....	.....	.....	118	.....	12	130
Total	2,698	1,002	1,431	124	140	12	129	5,536

LIII.—*SHIPMENTS of ORE containing GOLD or SILVER via the ATCHISON, TOPEKA and SANTA FE RAILROAD from NEW MEXICO for the calendar year* 1884.

Localities from which shipped.	To whom consigned.						Total.
	Pueblo Smelting and Refining Company.	Billings smelter.	Socorro Smelting and Refining Company.	Colorado Ore Sampling Company.	Kansas City Smelting and Refining Company.	Other smelters.	
	Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Deming	11	535	.....	.....	33	123	702
Engle	.....	48	.....	.....	.....	27	75
Gage	65	800	1,685	25	.....	61	2,636
Frorida	.....	59	.....	.....	.....	.....	59
Lake Valley	19,046	1,822	129	403	186	.....	21,586
Lordsburg	60	51	.....	.....	.....	14	125
Las Cruces	16	50	.....	.....	.....	.....	66
San Marcia	.....	19	.....	.....	.....	.....	19
Los Cerrillos	100	12	.....	.....	.....	37	149
Silver City	182	669	.....	12	.....	273	1,136
Socorro	.....	.....	.....	3	12	84	99
Total	19,480	4,065	1,814	443	231	619	26,652

LIV.—*SHIPMENTS of BASE BULLION containing GOLD or SILVER vi ATCHISON, TOPEKA and SANTA FE RAILROAD from January 1 to Decemb* 1884.

To whom consigned.	Locality from which shipped.				To
	Arizona.	New Mexico.	Utah.	Colorado.	
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pou*
Kansas City Smelting and Refining Company	698, 000	4, 414, 000	.....	12, 354, 000	17, 4
Pennsylvania Lead Company	102, 000	2, 004, 000	3, 562, 000	2, 052, 000	7, 7
Saint Louis Smelting and Refining Company	.....	.....	.....	12, 428, 000	12, 4
Aurora Smelting and Refining Company	628, 000	2, 862, 000	428, 000	.....	3, 9
Chicago Smelting and Refining Company	.....	.....	.....	5, 060, 000	5, 0
Manville Smelting and Refining Company	.....	.....	.....	2, 982, 000	2, 9
La Plata Mining and Smelting Company	.....	.....	.....	1, 346, 000	1, 3
Everett & Post	.....	.....	.....	746, 000	7
S. D. Thatcher	.....	982, 000	.....	.....	9
Omaha and Grant Smelting Works	248, 000	248, 000	.....	.....	4
Horn Silver Mining Company	.....	.....	.....	764, 000	7
Pueblo Smelting and Refining Company	.....	102, 000	.....	.....	1
E. Balbach & Son	120, 000	.....	.....	.....	1
Hudson & Co	518, 000	.....	.....	.....	5
Behn & Stiner	.....	262, 000	.....	.....	2
G. Billings, smelter	32, 000	280, 000	.....	24, 000	3
Boston and Colorado Smelting and Refining Company	.....	76, 000	.....	.....	7
Colorado Ore Smelting Company	.....	54, 000	.....	.....	5
Royal George Smelting and Refining Company	.....	.....	.....	142, 000	14
Phelps, Dodge & Co	106, 000	.....	.....	.....	10
Benson smelter	.....	24, 000	.....	.....	2
Other consignees	30, 000	24, 000	.....	89, 000	14
Total	8, 948, 000	11, 406, 000	3, 990, 000	37, 987, 000	62, 33
Deduct	6, 466, 000	74, 000	.....	.....	6, 54
	2, 482, 000	11, 332, 000	.....	.....	55, 79

LV.—*SHIPMENTS of ORE containing GOLD and SILVER via the ATCHIS TOPEKA and SANTA FE RAILROAD during the calendar year* 1884.

To whom consigned.	Locality from which shipped.						Tot
	Arizona.	New Mexico.	Colorado.	Texas.	Mexico.	Utah.	
	Pounds.	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pounds.*	*Pou*
Gustave Billings	2, 912, 000	11, 472, 000	.....	430, 000	.....	.....	14, 81
Pueblo Smelting and Refining Company	3, 702, 000	39, 358, 000	.....	516, 000	56, 000	.....	43, 63
Boston and Colorado Smelting and Refining Company	84, 000	578, 000	.....	232, 000	102, 000	.....	9
Kansas City Smelting and Refining Company	396, 000	660, 000	2, 666, 000	264, 000	.....	.....	3, 9
Omaha and Grant Smelting and Refining Company	442, 000	108, 000	.....	76, 000	20, 000	.....	6
Mathews & Webb	552, 000	66, 000	.....	846, 000	.....	.....	1, 4
Colorado Ore Smelting Company	300, 000	958, 000	.....	.....	.....	.....	1, 2
Denver Ore Smelting Works	.....	178, 000	.....	.....	.....	.....	1
E. Balbach & Son	20, 000	2, 000	432, 000	.....	.....	.....	4
Omaha National Bank	92, 000	.....	.....	.....	.....	.....	
Saint Louis Smelting and Refining Company	96, 000	.....	78, 000	22, 000	.....	522, 000	7
M. Malenjo	96, 000	.....	.....	.....	.....	.....	
Iron King Smelting Company	.....	86, 000	.....	.....	.....	.....	
J. F. Seldomridge	92, 000	.....	.....	.....	.....	.....	

HIPMENTS of ORE containing GOLD and SILVER via the ATCHISON, TOPEKA and SANTA FE RAILROAD, &c,—Continued.

n consigned.	Locality from which shipped.						Total.
	Arizona.	New Mexico.	Colorado.	Texas.	Mexico.	Utah.	
	Pounds.	*Pounds.*	*Pounds*	*Ponnds.*	*Pounds.*	*Pounds.*	*Pounds.*
.....	.....	.....	160, 000	.....	.....	.....	160, 000
ilting Works .	.....	156, 000	.....	.....	30, 000	.....	186, 000
.....	38, 000	.....	.....	.....	.....	.....	38, 000
unty Bank ...	148, 000	.....	.....	.....	.....	.....	148, 000
ley	294, 000	.....	.....	.....	.....	.....	294, 000
rer & Co.....	.....	128, 000	.....	.....	.....	.....	128, 000
.....	50, 000	.....	.....	.....	.....	.....	50, 000
ire Sampling							
.....	.....	70, 000	.....	.....	.....	.....	70, 000
.....	.....	46, 000	.....	.....	.....	.....	46, 000
dge & Co.....	.....	28, 000	.....	.....	.....	.....	28, 000
nt.....	.....	50, 000	2, 000	.....	.....	.....	52, 000
ing Company.	30, 000	20, 000	.....	.....	.....	.....	50, 000
ignees.....	43, 000	80, 000	20, 000	20, 000	60, 000	.....	223, 000
.....	10, 509, 000	54, 050, 000	3, 358, 000	2, 406, 000	268, 000	522, 000	71, 113, 000
ct.....	1, 122, 000	6, 000	.....	.....	.....	.....	1, 128, 000
	9, 387, 000	54, 044, 000	.....	.....	.....	.....	69, 985, 000

HIPMENT of BASE METAL, ORE, and BULLION containing GOLD and LVER via the UTAH CENTRAL RAILWAY for the calendar year 1884.

signors.	Locality.	Weight.	Consignees.	Locality.
		Tons.		
Mining Com-	Francklyn....	10, 889	Horn Silver Mining Company.	Chicago, Ill.
r.....	Morgan Stat'n	4, 958	Omaha Smelting and Refining Company.	Omaha, Nebr.
& Co	Milford	292	.....do	Do.
.....	...do	12	.....do	Do.
nace Company	Sandy	438	Pennsylvania Lead Works..	Mansfield, Pa.
ead Works...	Germania.....	950	To order at	Chicago, Ill.
rge Copper	Saint George..	15	Pope, Cole & Co	Baltimore, Md.
.....	Salt Lake.....	26	.....do	Do.
ard.....	Deseret.....	10	H. H. Vivian & Co.....	Swansea, England.
rarding Com-	Ironton	531	Boston and Colorado Copper Company.	Argo, Colo.
ng	....do	6, 923	Colorado Smelting Company	So'th Pueblo, Colo.
.....	....do	2, 777	Omaha and Grant.....	Denver, Colo.
.....	....do	346	G. Billing	Socorro, New Mex.
Lead Works ..	Germania.....	616	Colorado Smelting Company	So'th Pueblo, Colo.
.....	....do	610	Omaha and Grant Company.	Denver, Colo.
.....	....do	182	.....do	Omaha, Nebr.
.....	....do	16	Kansas City Smelting and Refining Company.	Argentine, Kans.
.....	....do	11	E. A. Dooley.....	Oakland, Cal.
Co.....	Salt Lake.....	207	Castle Dome Mining and Smelting Company.	Melrose, Cal.
.....	....do	44	Melrose Smelting Company.	Do.
.....	....do	1, 018	Kansas City Smelting and Refining Company.	Argentine, Kans.
derson	Sandy	67	Castle Dome Mining and Smelting Company.	Melrose, Cal.
.....	....do	137	Omaha and Grant Smelting and Refining Company.	Denver, Colo.
rardir g Com-	Ironton	329	Kansas City Smelting and Refining Company.	Argentine, Mo.
r.....	Morgan.....	359	Omaha and Grant Smelting and Mining Company.	Omaha, Nebr.
e.....	Salt Lake	24	Boston and Colorado Copper Company.	Argo, Colo.
.....	.....	31, 787		

LVII.—*SHIPMENT of ORE and BULLION via NORTHERN PACIFIC RAILROAD during calendar year* 1884.

Place of shipment.	Territory.	County.	Consignees.								Total shipments.
			Newark, N. J.	New York, N. Y.	San Francisco, Cal.	Liverpool, England.	The Lamb Smelting Works, Chicago, Ill.	The Omaha Smelting Works, Omaha, Nebr.	Portland, Oreg.	Canton Junction, Mass.	
			Tons.	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*	*Tons.*
Townsend	Montana	Jefferson	.....	.....	.....	.....	10	.....	.....	.....	10
Jefferson	do	do	42	.....	.....	.....	.....	.....	.....	.....	42
Wicks	do	do	3,866	.....	.....	.....	.....	.....	.....	.....	3,866
Helena	do	do	380	.....	.....	.....	.....	.....	.....	.....	380
Corbin	do	do	277	.....	.....	.....	.....	.....	.....	.....	277
Butte	do	Silver Bow	10	.....	.....	.....	.....	.....	.....	.....	10
Do	do	do	.....	.....	.....	13,103	.....	.....	.....	.....	13,103
Do	do	do	.....	11,442	.....	.....	.....	.....	.....	.....	11,442
Do	do	do	.....	.....	2,947	.....	.....	.....	.....	.....	2,947
Do	do	do	.....	.....	.....	.....	.....	.....	55	.....	55
Do	do	do	.....	.....	.....	.....	.....	.....	.....	392	392
Big Timber	do	Gallatin	56	.....	.....	.....	.....	.....	.....	.....	56
White Sulphur Springs.	do	Meagher	.....	.....	.....	.....	.....	12	.....	.....	12
Custer	do	Custer	.....	.....	.....	.....	.....	14	.....	.....	14
River Landing	Dakota	Burleigh	495	.....	.....	.....	.....	.....	.....	.....	495
Total	.....	.....	5,128	11,442	2,947	13,103	10	26	55	392	33,101

PART III.

MISCELLANEOUS.

MISCELLANEOUS.

GOLD AND SILVER MINING IN CALIFORNIA, PAST, PRESENT, AND PROSPECTIVE.

By WALTER A. SKIDMORE.

HYDRAULIC MINING AND DÉBRIS LITIGATION.

The most notable event in the history of mining in California during the past year has been the suppression of hydraulic mining by judicial process, following the final determination in our courts, both Federal and State, of what has been known as the *anti débris* litigation.

The result of this long contested litigation between the farmers and miners is so fraught with serious consequences to the prosperity of our State, and perhaps eventually to the nation at large, that a brief review of its history seems opportune and proper.

The farmers and miners were first arrayed against each other in July, 1876, when one James H. Keyes, a farmer on Bear River, commenced an action against about thirty large mining companies and a hundred or more individual miners who dumped their tailings into Bear River, whence they were washed during high water upon his lands.

Keyes having lost his suit in the supreme court on a technical point, other suits were brought on a like cause of action by persons residing on the Feather, Yuba, Bear, and American Rivers, and finally by the State of California, through her attorney-general, against the Gold Run Mining Company, of Placer County, to test the question as to the right of the company to flow its *débris* or tailings into Canyon Creek, a mountain stream, distant about 90 miles from the nearest navigable river.

This case, after a long and ably contested trial in the superior court, was decided against the mining company, and on appeal the decision of that court was affirmed by the supreme court of California in November, 1884.

It is unnecessary to detail the numerous actions litigated since 1876, all having the same object, the perpetual injunction of the mines; suffice it to say that it was the intention to enjoin every hydraulic mine in the State, and that this object has been at least partially accomplished as witnessed by the marked falling off of our gold product during the year 1884, and the threatened further reduction for next year, as the injunction decrees of the Federal court did not take full effect until June, 1884.

All the great companies have ceased work, in obedience to the decrees

of the courts, and the smaller ones are gradually retiring from business in anticipation of trouble. This condition of affairs must prevail until national or State legislation, or a modification of the decrees of our courts by the Supreme Court of the United States, shall find a remedy, and determine under what restrictions, if any, mining may be lawfully pursued, and the gold product of California maintained to its standard of the past decade.

The area immediately affected by the suppression of hydraulic mining extends from the Feather River, on the north, to the Cosumnes River, on the south, a length of 144 miles of auriferous territory lying on the western slope of the Sierra Nevadas, intermediate between the foot hills and the "high Sierra." The average width of this gold-bearing territory is about 48 miles, giving an area of nearly 7,000 square miles, all of which may be classed as "mineral lands," though only a very small portion could be worked by the hydraulic process.

Within these limits it is estimated that more than 20,000 men have been thrown out of employment, and a great depreciation of property and decrease of population has necessarily followed. This is shown by partially compiled returns from reliable residents, returned in the following table, which must, however, be taken, in some instances, as an approximation, and in others an estimate; as absolute accuracy was impossible pending the crisis which followed the closing of the mines.

County and district.	Decrease of gold yield per annum.	White men of all classes deprived of employment.	Depreciation of taxable property.
BUTTE COUNTY.			Per ct.
Forbestown district	$100,000	100	85
Oroville district	125,000	92	
Whole county	240,000	500	
NEVADA COUNTY.			
Whole county	1,250,000	1,480	50
Washington district	100,000	164	75
N. San Juan ridge	1,000,000	800	.....
SIERRA COUNTY.			
Scales district	100,000	450	60
Table Rock district	250,000	420	25
Brandy City	100,000	93	.....
PLACER COUNTY.			
Dutch Flat district	350,000	400	90
Iowa Hill	100,000	300	75
PLUMAS COUNTY.			
Spanish Ranch district	200,000	500	50
TEHAMA COUNTY.			
Deer Creek district	250,000	100	.....

NOTE.—The returns of decrease of gold yield and depreciation of taxable property are estimated for the year 1885.

The most populous and the greatest gold-producing region lies within the limits of Nevada County, on the watershed of the Yuba River. Here, owing to the systematic method of conducting the business of hydraulic mining by the large companies, accurate details have been

compiled of the labor and gold production for the year preceding the closing of the mines. They are as follows:

Number of miners employed.

Eureka Township	175
Bloomfield	200
Bridgeport	260
Nevada	200
Washington	70
Little York	250
Rough and Ready	40
Transient employés	235
Total number of men deprived of employment, exclusive of Morris and Wolsey's flats	1,430

Shipment of gold bullion for 1883.

Wells, Fargo & Co. (Nevada City)	$1,141,418
Citizens' Bank	225,000
Private parties (estimated)	200,000
Estimate from other districts including private parties	1,250,000
Rough and Ready and Little York Townships	425,000
Total	3,241,418

MINING REGULATIONS AND CUSTOMS.

When gold was discovered on the American River in 1848, this remote and recently acquired Territory was a *terra incognita* to the people of the United States. This discovery brought an unparalleled immigration to California. Not less than two hundred thousand people, within three years, were located in the mining counties of this State, and one hundred thousand still remain.

Mining for the precious metals was a new industry to the people of the United States. They had no laws applicable to the wants and necessities of miners. The title to the lands was in the United States, and it neglected, for the period of eighteen years, to pass any law with regard to mining. The miners themselves, from the necessities of the case, made rules and regulations for their own government, as to the extent and manner of holding mining claims and the use of water for mining purposes. Under these customs and usages twelve hundred millions of gold have been extracted from the mines of California, nine hundred millions of which came from the ancient river channels in Nevada County alone, and more remains than has been heretofore extracted. One hundred and fifty millions of capital is now invested in mines in California, one hundred millions of which is invested in hydraulic mines.

CONDITIONS OF THE RIVERS AFFECTED BY MINING.

It is a matter of fact in the history of our State that for over thirty years last past, there has been a large amount of gold mining carried on by the hydraulic process on the watersheds of the Yuba and Feather Rivers. These rivers have been gradually filling with mining *débris* during all this time, until, perhaps, within the last year or two, when a large portion of the mining has ceased. It has been the custom since the beginning of mining in California to flow the *débris* into the streams as the only outlet, and there is no other possible way of working the mines. This custom has been, until recently, sanctioned by the legis-

lative and judicial departments of both the State and Federal Governments.

The enjoined mining companies and their predecessors, in common with other miners, have, in conducting their operations, discharged *débris* into the Yuba River and its tributaries for more than twenty-five years last past, and claim that their acts are lawful, and that they have in nowise exceeded the power conferred upon them by State and Federal legislation, and have used their property in the only way that such property could be used. The valley people have been fully advised of all the facts from the beginning of mining to the present time. Prior to 1876 they never objected to the use of the rivers for the flow and deposit of mining *débris*. More than twenty-five years ago the effect of such flow and deposit upon the Yuba and Feather Rivers was as well understood as now. As early as 1862 the low bottom lands on the Feather and Yuba were covered to a greater or less extent with mining *débris*. From that time until within the last year or two the beds of the rivers have been gradually filling. During these years vast mining interests have grown up on the headwaters of these streams, and a new generation has taken the place of the early miners.

All gold mining in California has been and must be conducted by the use of water to separate the sand, rock, and earthy material from the gold; and when that has been done the water charged with the *débris* must necessarily flow into the natural water courses.

It is asserted by the miners that there has been no change in the mode of mining causing any new exigency warranting legal proceedings. Hydraulic mining, as now practiced, they allege, does not increase the amount of material discharged into the stream. On the contrary, they say the amount so discharged has been slightly diminishing during the last eight years.

It is, however, a well established fact that there is in the Yuba River and its tributaries some 750,000,000 or 800,000,000 or more cubic yards of material, which will find its way down unless checked in some way, as it covers 40 or 50 square miles, varying in depth from 10 to 150 feet or more, distributed for hundreds of miles along these channels. This has been the accumulation from all sources since 1862, when most of the then *débris* was swept into the lower rivers. That it is slowly but surely finding its way down is certain. The result of this winter's rains has developed the fact that, although most of the large mines have suspended work, yet the flow of *débris* down the Yuba below the mountains is nearly as large as ever. In fact the sands are moving down.

So long as mining continued the flow of water from the mines was loaded with material in suspense to such an extent that it was not capable of transporting much more from the rivers. Hence it passed on laden to its ordinary capacity until it was at comparative rest below, when it dropped its load—not of sand, but of a fine silt. Since the farmers have succeeded in closing the more important mines the problem is being solved, for the quantity of water in the river will be henceforth much reduced, as the great mining reservoirs are either empty or not being drawn upon, and at the same time there is more material in shape of sand moving down than heretofore. It continues to move down until it reaches a point where, owing to the grade of the river the water drops it, and consequently the lower rivers are steadily filling, and will continue to fill until the river channels above are cleared again to bed rock, and as far down below the mountains as the grade will permit the material to flow. During the winter season the increased

quantity of water will aid this flow of heavy material, but there is a point below which it will only pass during high stages of water, which is for a limited season of the year only.

RESULTS OF THE DÉBRIS LITIGATION.

In the great controversy which has now reached a judicial conclusion, and the result of which will in the future materially affect the production of gold, there was placed in juxtaposition two acknowledged legal maxims, which in this instance were in direct conflict on an issue of national importance. They were, on behalf of the miner: "He has the better right who was first in point of time." And for the farmer: "So use your own as not to injure others." And the courts have determined that in this case the latter must prevail.

In the language of the decree of the United States circuit court in the case of Woodruff *vs.* North Bloomfield *et al.*, the defendants are "perpetually enjoined and restrained from discharging or dumping into the Yuba River, or into any of its forks or branches, or into any stream tributary to said river or any of its forks or branches, any of the tailings, bowlders, cobble-stones, gravel, sand, clay, or refuse matter from any of the tracts of mineral land or mines described in the complaint. And, also, from allowing others to use the water supply of said several mines or mining claims or any part thereof, for the purpose of washing into said rivers and streams any earth, rocks, bowlders, clay, sand, or solid material contained in any placer or gravel ground or mine." But there is a qualification that they may apply "upon any showing which the court may deem sufficient that the conditions have been so changed that the discharge of such mining *débris* into streams may be resumed or otherwise conducted, so as not to create or continue or contribute to create or continue the nuisance complained of, or a nuisance of a similar character, and so as not to injure or damage or contribute to injure or damage said complainant, or upon any other grounds hereafter arising satisfactory to the court. And the court reserves the power to modify or suspend said injunction in whole or in part, as the exigencies and equities of the case hereafter arising may require." And the supreme court of California, in affirming the judgment of perpetual injunction in the case of The People *vs.* Gold Run Mining Company, took occasion to say, "if it be possible to permanently impound the *débris*, the defendant has the right to adopt such means as may be within its power for that purpose. The perpetual injunction does not restrain the defendant from conducting its business in a lawful manner, and any means adapted to that end are lawful."

These qualifications and reservations would indicate that it was with reluctance that the courts closed so vast and important an industry, and that its resumption at such future time as means may be devised to conform to the terms of the decrees is not an improbable event.

MAGNITUDE OF HYDRAULIC OPERATIONS.

It appears from official statistics that there are in the State of California, nearly 5,000 miles of ditches constructed for the conveyance of water to mineral lands. Many hundreds of ditches embraced in the official returns are however of an ephemeral nature; they are used for a few seasons and then discarded. But the large canals and reservoirs of the great hydraulic mining companies are works constructed to last many decades. They have tapped mountain lakes in the high Sierra

and turned their waters into the natural streams, where they have a favorable points built dams and constructed reservoirs of great capacity for the storage of the water for use in the dry season. From these reservoirs radiate the great system of canals and flumes, hundreds of miles in length, which conducted the water to the ground to be washed. In the conduit of the water it was often necessary to build hanging flumes around precipitous cliffs; to tunnel through hundreds of feet of hard rock; to erect framework more than 100 feet high, to carry the flumes, and some times to lay iron pipe of 24 to 32 inches diameter across depressions of the surface. A segregation of this class of canals shows that twenty-four have been constructed on the water-shed of the Sacramento and San Joaquin Rivers alone, within the area immediately affected by the injunction of the courts. The aggregate length of these large canals is 1,470 miles, and the original cost $10,176,843; but this does not include the annual cost of repair and maintenance, which would swell the total cost to fifteen or sixteen millions of dollars, exclusive of the cost of the great reservoirs. The largest of these reservoirs are situated within the limits of Nevada and Sierra Counties and supplied the mines on San Juan Ridge, which are now closed by injunction. Their aggregate area is 2,169 acres at high-water plane, and the dry season storage capacity 2,158,300,000 cubic feet.

PROPOSED REMEDIAL MEASURES.

The courts having decided that the miners had not acquired any prescriptive right to the use of the rivers as places of deposit for their *débris* and tailings, the question arises, can the mines be worked by any other than the hydraulic process? And, if not, can the material described in the enjoining decree be restrained so as not to reach the navigable rivers? It has been demonstrated by prospecting and experiment during the past year that but a very small portion of the hydraulic ground contains sufficient gold to justify opening and working by the drifting method. By the hydraulic process ground containing on an average 1 cent to the cubic foot would be considered exceptionally rich in large tracts, and ground containing half a cent per cubic foot has been worked with profit, while the minimum of profitable working by the drifting method would be about 10 cents per cubic foot.

This effectually disposes of all hopes of working by drifting, which, in addition to the expense of extracting and washing the dirt, would require new and expensive plants of either long tunnels or deep shafts. Many ingenious mechanical devices have been suggested and planned to raise the gravel from its banks, and after washing return it to the old pits, but at the present time none have been constructed, and it is doubtful if any such devices are economical or practicable.

The solution of the problem whether hydraulic mining can ever be resumed on its former scale of magnitude, and other classes of mining be carried on with security, rests solely on the construction of impounding dams of great height and strength in the beds of the mountain streams below the mines and at a suitable and safe distance above the valleys. Such dams, which are pronounced practicable by the best engineering talent, would settle the heavy material behind them, where it would be impacted and become as firm as the original beds, but the water flowing over the crest or through the escape gates would still carry a proportion of silt in suspension, assumed to be 20 per cent. of the contents of the mountain streams. The question is merely one of

expense, as in addition to the original outlay for construction the dams would have to be raised from time to time as they filled, or others constructed above them. This system has been in operation on a small scale on Slate Creek in Sierra County, and its efficiency has been practically and satisfactorily demonstrated, as at the time of this writing, January, 1885, no claims above them have been enjoined.

Taking into consideration the fact that two-thirds of the total gold product of the State has been the result of working by the hydraulic process, it is reasonable to suppose that some remedy may be found which will meet the sanction of the courts.

DRIFT MINING.

It has been erroneously stated and published that the suppression of hydraulic mining would have a tendency to promote this branch of industry. Such is not, however, the case, for drift mining as a business must rely upon its own merits, and will continue as heretofore to be one of the principal sources of our gold production as it is one of the most interesting features in the history of mining in California. The principal field of operations in this class of mining is on the system of buried rivers which were the affluents or tributaries of the ancient Pliocene rivers of the State. These streams pursued devious courses, whose direction, grade, and continuity under their lava capping can only be surmised, rendering the work of exploration both expensive and risky, though compensated by large returns when the channel is found.

In this class of mining, operations during the year have been unusually active and generally successful, there having occurred fewer failures than heretofore. A number of new claims have been brought to a productive condition, some of the old companies having meantime made an excellent year's work. The Forrest Hill and San Juan divides, with various other localities in Placer and Nevada Counties, and also in Butte, Plumas, and Sierra Counties, have continued to be the principal sites of drift mining. A great deal of preliminary work has also been done in the neighborhood of Slate Creek, which, during the current year, promises to become the theater of active drift operations.

Mr. George F. Allardt, C. E., has recently visited the drift region of Sierra County at the instance of the Sacramento Valley Anti-débris Association, and furnished in his report some interesting information and statistics respecting this class of mining, which are briefly presented in extracts from his report.

The North American is a drift mine, near the head of Slate Creek, in Sierra County, at an altitude of 5,630 feet above the sea. The material is brought to the surface through a tunnel 4,400 feet in length. The tunnel and drifts are provided with railroad tracks, and the material is transported in cars drawn by mules. About 150 cubic yards of gravel are run out daily and are washed with 50 inches of water. The working force consists of 20 white men and 30 Chinamen. At the Bald Mountain drift mine, Forest City, Sierra County, the tunnel is over a mile in length. The material is hauled out in cars drawn by a locomotive constructed expressly for this service; a train consists of 16 or 20 cars, each car carrying about two-thirds of a cubic yard. At the present time they run out about 150 cars per day. This amounts, therefore, to 100 cubic yards per day, or say 30,000 cubic yards per annum. Seventy-five white men are employed; no Chinamen.

The Bald Mountain Extension is also a drift mine, situated at Forest City. It has a long tunnel, and also tails into Oregon Creek. Its

equipment is similar to that of the Bald Mountain mine. It discharges about 24,000 cubic yards of gravel per annum, and employs 75 white men.

The Ruby is about a mile from Forest City, a comparatively new mine, employing at present about 40 white men, and discharging 15,000 cubic yards of gravel per annum.

The Derbec drift mine is situated near North Bloomfield, Nevada County, and has a vertical shaft 400 feet in depth, also a long tunnel; discharges about 21,000 cubic yards per annum, and employs 72 white men; uses about 100 inches of water to wash the gravel.

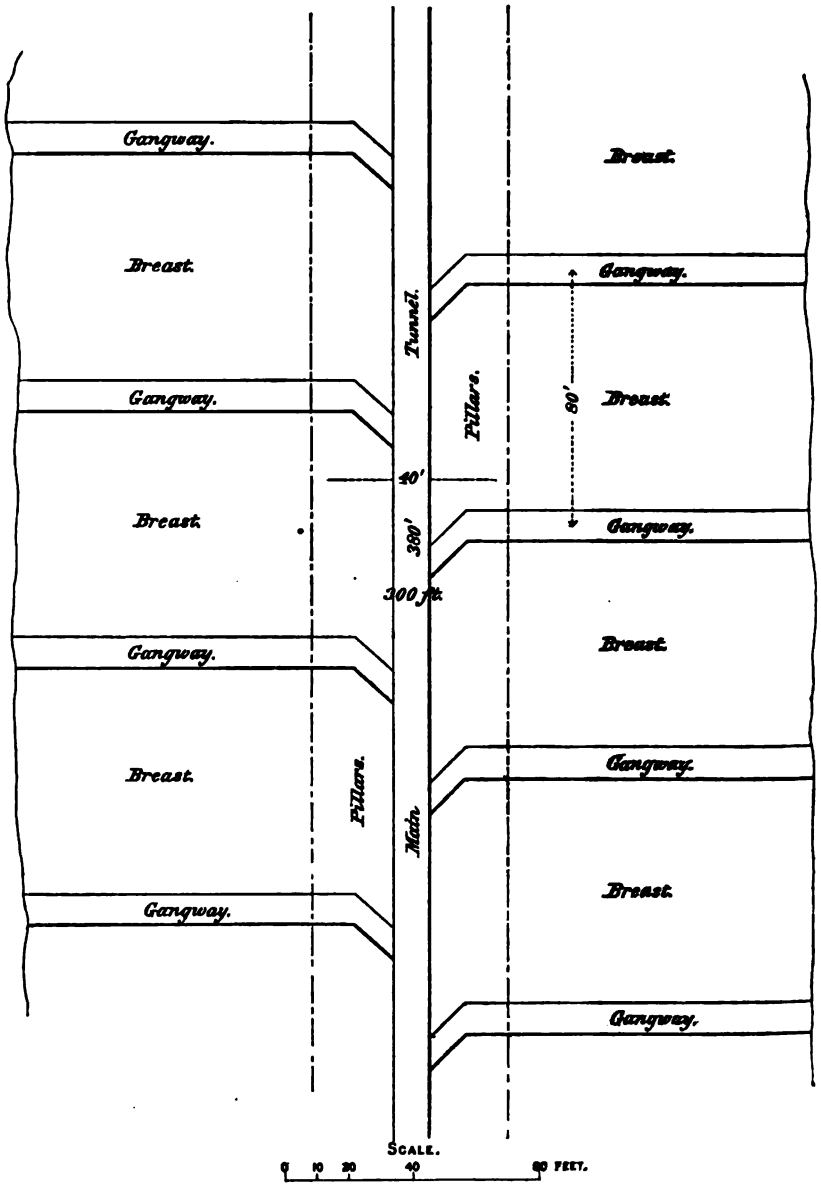
Mr. Allardt's observations were made at a season when water was scarce, and do not fully represent the average annual output of the gravel or the number of men employed. These items may be reasonably increased 33 per cent for the operations of a good year.

In Sierra County during the past year the mines have done well. The Bald Mountain Company, at Forest City, has been engaged during the year in taking out its pillars, and realized handsomely from that source. The Bald Mountain Extension Company have cleaned up from the gravel taken out of the South Fork claim, through which they are following the lead back to their own channel, nearly $70,000 for 1884, over $40,000 of which have been paid out in wages. They will soon be working the pay channel on their own ground. Beyond a lava flow, 1,100 feet in width, the extension of their lead has been found, which, without doubt, extends for miles up the Pliocene ridge. An incline, at a grade of one foot in four, is being put up 240 feet through the lava to reach the channel over 50 feet above the main tunnel, only 40 feet of which remains incomplete. The loaded cars going down will haul up the empty ones. The gravel is so rich that large specimens are frequently found in the breasts, and pays $5 per car load. It is believed that a gold lead lies under the lava flow, which will be prospected in time.

The method of working drift mines is substantially the same throughout the State. It was described in detail in the Mint Director's report for 1883, page 717. The original manuscript was accompanied by a diagram which was mislaid, and not printed in the report of that year. This diagram is here presented with sufficient of the text of the report of 1883 to explain the method of working the mines as illustrated by the accompanying diagram.

The method of extracting gravel in drift mines is in many respects similar to that pursued in coal mining. A shaft or slope is sunk, or a tunnel run, if the nature of the ground will permit. When the pay gravel is reached it is cross-cut from rim to rim and gangways are run at right angles, laying off the ground in blocks. These are called breasts. The main tunnel is always carried well ahead of the gangways. Pillars are left to support the main tunnel, which follows as nearly as practicable the gutter of the channel. The breasts are supported by temporary posts and by the "stacking" of the larger bowlders. As breast after breast is worked the ground is abandoned and left to settle. Tunnels are sometimes run too low or too high; in the latter event the work must be commenced anew and at a more favorable point. If too low, an upraise shaft is raised until the gravel is tapped, when a main gallery is run above the tunnel bed, and the ground worked as above described, the gravel being dropped to the main tunnel by chutes.

In the accompanying diagram of a drift mine the main tunnel runs through the center and the gangways diverge on either side until the rim or limit of pay is reached. The main gallery or tunnel is usually



PLAN SHOWING METHOD OF WORKING DRIFT MINES.

H. Ex. 268

r 12 feet on bottom, 8 or 9 feet high, and 3 to 4 feet wide on the top; e the breasts are from 3 to 5 feet in height. Hence the area cov- by the gallery and gangways bears a proportion in cubic contents ıe whole ground worked.

rift mines are rarely worked by perpendicular shaft, as the method th inconvenient and expensive. Shafts are sunk to the bed-rock for oratory purposes. When by means of drifts in various directions extent and apparent course of the channel is determined, a tunnel ın if practicable. Some of these tunnels have been run a distance mile through the rim-rock before the channel has been struck, but is never done unless a prospecting shaft or a neighboring tunnel demonstrated the existence and value of the channel.

'here a tunnel is not practicable, or where a tunnel having been run wer channel has been found below its grade, the ground is opened ncline or slope. Many effective and original devices are used for ling up the loaded cars and providing ventilation. At the Bald ıntain Extension mine of Forest City, Sierra County, the incline is feet in length with a pitch of 1 foot in 4, making the perpendicular 65 feet. The upper part of the incline, for a little more than half length, has a double track; at the junction of the single and double ks there is an automatic switch which is set by the descending loaded . The drum is 2 feet in diameter, and is 25 feet from the head of incline. Two steel ropes, half an inch in diameter and each 300 feet , are used, unwinding from the center of the drum towards the ends. break used is an ordinary strap break, having a compound lever chment, making it automatic to the extent that it will by its own ght hold two loaded cars on the incline. The whole outfit worked othly from the start, two loaded cars being lowered in about thirty nds. The double shaft through which gravel was at first taken out been utilized by placing in one of the compartments an air-blast. air, which comes in through 6,000 feet of 11-inch pipe, is taken by air-blast down the 60-foot shaft and forced up and into the drifts tunnels, bringing the works, so far as ventilation is concerned, for ndefinite period within the last-mentioned distance from the outer

ı the northern part of Sierra County the Cleveland and Sierra Min- Company and the Sierra Union Water and Mining Company have olidated for the purpose of working by the drifting process 3 miles hannel extending from near the Iowa shaft to a point below Scales gings. A tunnel has already been commenced at the lower end he ground of the following dimensions: Height, 7 feet; width at om, 7 feet; width at top, 42 inches, all inside of timbers. A new liance is to be used by which the cost of transportation of gravel ı the mine to the dump will, it is believed, be reduced to a ratio h less than that of any other mine of this class. The transporting er to be employed is an endless steel-wire rope of probably half or e-quarters of an inch in diameter, running over large sheaves at the ıth and inner end of tunnel or at a turnout as near the inner end as exigencies of the work will permit. This cable will be carried along top of the tunnel on small sheaves to the inner station, and back he dump at the bottom of the tunnel between the rails, being sup- ed along its course by small sheaves affixed to the mud-sills at suit- distances apart. There is to be a special car fitted with a grip or ce for clutching the cable when it is desired to move the cars, which be run in trains of as many as necessary. At a point where lateral

lines of track join the main track by means of switches the switch rails are raised slightly so that the car will pass over the cable on to the main line. The motive power will be water acting upon a "Pelton" wheel. When it is desired to send in a train of empty cars the motion of the cable is reversed. The channel is known to have a grade of 2 feet to each 100 for a distance of 3½ miles, consequently the loaded cars will require to be regulated simply as to speed. This machinery will not be put in until the tunnel is in 1,000 feet. It will not be necessary to keep the tunnel absolutely straight, as no difficulty will be experienced in providing for slight deviations. No insuperable obstacles intervene as against a right-angled or a return curve, if such were necessary.

A writer in the Downieville Messenger, who is evidently a practical drift miner, makes the following pertinent suggestions with respect to the future of this interest:

"In no other branch of mining has so little improvement been made upon the original and primitive methods as in drift gravel mining. It is true that in a few instances, notably in the Bald Mountain mine, in this county, machinery is being used to cheapen and expedite the extraction of gold-bearing gravel, but with one or two exceptions the manner of working is substantially the same that it was almost in the beginning of the industry. In later days the tunnel is somewhat larger and less sinuous. The timbering is more substantial. It is usual now to use posts from 10 to 20 inches in diameter, and for special purposes a diameter of 2 feet is not uncommon. Caps range from 12 inches upward. The original method of making a nearly square tunnel has long been abandoned in the larger mines, and the custom now is to make the main tunnels at least 7 feet on the bottom, 6½ to 7 feet high by 3½ feet at the top—all these measurements 'in the clear' or inside the timbers. A cross-section of a modern mining tunnel would thus present the appearance of a perpendicularly bisected truncated pyramid. The object of thus placing the posts is to prevent that rapid crowding in at the bottom in soft ground, which with a post set perpendicularly would ensue, entailing delay and expense for repairs. Of late years T-rail has come largely into use in mining tunnels. This rail is either steel or iron, varying in weight from 16 pounds to the yard and upwards for the former to from 24 to 42 pounds to the yard for the latter. The advantages of this rail over the strap rail laid on wooden stringers are numerous and essential. While the first cost is more, the wear upon wheels and car bodies is infinitely less, and the ease with which a car is moved is much greater. Another advantage is that in swelling ground this rail rises in long swells instead of sharp hummocks, the advantages of which in tunnels of moderate gradients are obvious. In the 'car' there have been some minor improvements, but that vehicle is substantially the same, being a box upon four wheels. From holding less than half a cubic yard, it has grown to hold a full cubic yard, weighing with its contents, when full, about 4,000 pounds. Instead of wheels loose upon the axles, they are rigid, and the axles of steel turn in babbitted self-oiling boxes. Instead of the car being pushed by hand, mules are now used where the distance is great, each animal taking a train of eight cars, more or less, depending upon the gradients to be overcome. The foregoing are, in brief, the more important changes that have taken place in the evolution of drift gravel mining. In the economy of drift mining no inconsiderable expense attaches to moving the gravel from the inside of the mine to the dump."

DÉBRIS TAILINGS.—METHOD OF WASHING.

he mountain rivers and streams below the great hydraulic ranges e in the course of twenty-five years become the receptacle of the erial washed by the hydraulic process. These accumulations have ome cases attained a depth of 75 or 80 feet and a width of 200 feet a distance of many miles. The contents consist of coarse sands, bles, and cobbles, the lighter material having passed off in suspen- as muddy water. These enormous deposits contain much gold and lgam which was not saved in the sluices and undercurrents, and nany parts of the State measures are being taken to rewash these ings.

nother incentive to this class of mining is found in the fact that ıy of the streams contain rich bars and banks which were but par- y worked by the early placer miners when the inundation of *débris* ı the hydraulic mines covered their claims. There are also in many ances stretches of the primitive stream which have never been dis- bed by the miner's shovel and pick.

ne of the largest enterprises of this class is on Slate Creek, Sierra nty. Here in one mass is found a body of tailings from 6 to 7 miles g, with an average width of 200 feet and a depth ranging from zero 5 feet. The quantity has been estimated by engineers at 5,500,000 ic yards. As they now lay in the stream they have a uniform grade bout 15½ feet to each 1,000, except where locally changed by the let of some large mine emptying into the creek and forming a dam, ve which the grading continues with the same regularity. The ac- ulated tailings in this creek are the result of thirty years' hydraulic rations, and are known to contain, as do like deposits throughout the te, a large quantity of gold, estimated by engineers to be worth 10 ts per cubic yard. The creek has been fed by the working of about acres of hydraulic ground which was exceptionally rich, having a rd of production approximating $1 per cubic yard. It is hardly sible that 90 per cent. of the gold was saved, and the estimate of 10 ts per cubic yard may be considered as a safe basis, as the drift- ground tailing in the creek was not included in the estimate of area he mining ground washed. These tailings are the product of the ricts of Howland Flat, Gibsonville, Pine Grove, Saint Louis, and ss Flat.

he method of working these tailings is to commence at the lower end he limit of the deposit, where there are natural falls, and run up an ı bed-rock cut, advancing it from year to year until the grade runs

The accumulated tailings fall into this cut by the action of the er of the stream, controlled and directed by temporary wing-dams ted at intervals. This rock cut is merely a ground sluice terminat- in an ordinary hydraulic flume laid with wooden blocks, its inter- s charged with quicksilver, and this again supplemented below by ercurrents laid with T-railroad iron and charged with quicksilver. he tailings are run off during the water season, the cut and flumes extended up-stream until all the tailings have been washed through cut, flumes, and undercurrents. An operation of this kind, once ef- ıally opened, is self-operating and continuous. The expense is mainly cleaning up," which involves an outlay for labor once every season. ke system of mining is in successful operation in Indian Cañon, er County, below Iowa Hill, and others have been projected on Bear other rivers where large masses of tailings exist. That these ams contain many million dollars' worth of gold, which may be

cheaply reclaimed, is fully demonstrated. This closing of the hydraulic mines is no detriment to the owners of these river beds, which are located as mining ground.

EASTERN SLOPE OF SIERRA NEVADAS.

The metalliferous region of the eastern slope of the Sierra Nevada embraces the counties of Alpine, Mono, Inyo, and San Bernardino, in the order mentioned proceeding southerly. The bullion product of Alpine County is estimated by Professor Hanks, State mineralogist, in his report for 1884, at not more than $30,000 per annum. The many thousand miners who were formerly engaged in prospecting and operating its numerous veins have dwindled to hundreds, and only a few of the many mills erected are now in operation, and those for only a brief season of the year. The ledges are almost universally silver-bearing, of low grade and a refractory character. In Mono County, since the decadence of the rich gold quartz mines of Bodie district, attention has been drawn to several argentiferous districts which have so far produced a good record on limited development and give promise of permanence.

Inyo County is both gold and silver producing to a limited extent. Within its boundaries are situated more than twenty mining districts, among which Cerro Gordo and Darwin and Panamint have in past times been the scene of great mining operations, but are now in a condition of inactivity and decay. Its physical characteristics, both topographical and geological, have been so fully described in the report of the Mint Director for 1884, pp. 150–158, as not to require further notice here.

The recent completion of the Carson and Colorado Railroad down the Owens River Valley into the heart of the mineral region of Mono and Inyo Counties has not as yet been productive of any material revival of the bullion product of former years, but as the region is one of great interest and likely to attract the attention its mineral wealth deserves under the new conditions of railroad facilities, some description of its principal features by Prof. J. D. Whitney, formerly State geologist, are worthy of being placed on record, and will doubtless prove of interest. He says, in his geological reconnaissance:

"Owens River rises in the Sierra Nevada, not far from the head of the San Joaquin, and near the south end of the valley sinks in the lake of the same name, which is about 20 miles long.

"Owens Valley is a narrow basin between extremely lofty mountains; it is about 140 miles in length, north and south, and its average width is about 10 miles. Along its western edge it is bordered by the Sierra Nevada, which presents an almost unbroken wall in this part of its course, rising in its highest peaks, which are just opposite Owens Lake, to 15,000 feet, and having no pass across it of less than 11,000 feet in elevation. Opposite Owens Lake the descent from the summit of the Sierra to the valley must average fully 1,000 feet per mile, the distance being 10 or 11 miles, and the difference of level in that part of the range between the highest points and the valley being from 10,500 to 11,000 feet. This would seem to be one of the steepest mountain profiles in the country.

"This portion of the Sierra, as seen from the valley, is peculiarly grand; the steep slopes rise from the desert plain, and are everywhere naked and destitute of forests, the only trees being the pines in the cañons, and the scattered nut pines, which are scrubby and small, and extend up about 8,000 or 9,000 feet, the rest of the ridges being made up of patches

of bare soil, with exceedingly steep slopes of naked gray rock or snow. From this side the mountains look desolate, forbidding, and immensely high, so much so that it is a wonder it had never been surmised that this was the most elevated portion of the Sierra, until the visit of the Geological Survey to this region in 1864.

"On the eastern side of the valley the mountains are more broken, but most as high and grand as those on the western, and apparently forming one continuous range, the region in question and between Owens Valley and the Colorado is, beyond a doubt, the most difficult region to explore within our territory. The range on the eastern side of Owens Valley is called the Inyo Mountains towards the south end, and the White Mountains further north; but there does not appear to be any especial reason for thus dividing the chain, as it is a continuous one.

"These mountains are very dry and desert like, not a single stream of any size flowing from them into Owens Valley, which is exclusively supplied with water by the melting of the snow stored away during the winter on the upper part of the eastern slope of the Sierra. The quantity of rain which falls in the valley must be exceedingly small at all times, and during the year 1863 and 1864 it was, as reported, almost null. The White and Inyo Mountains are destitute of forest vegetation, excepting a few scattering, scrubby pines."

The shipment of gold from Bodie district, Mono County, amounted for the year 1884 to over a million dollars, the output of each mine and locality in and about that district being given below:

Standard Consolidated	$305,274 03
Bodie Consolidated	617,939 49
Syndicate	171,049 56
New Standard	17,714 76
Bodie Tunnel	2,075 90
Wagner's Tailings, mill	17,600 00
Virginia Creek Hydraulic Company	21,300 00
Scattering	8,630 00
Bodie Ore, dump pile	714 00
Total	1,162,297 74

The total value of bullion, mostly gold, sent from Bodie district up to the present time amounts to about $17,000,000.

Following is the record of the two leading mines of the district:

Total output of the Standard Consolidated to December 31, 1884.

1877	$784,522 80
1878	1,025,383 35
1879	1,448,835 47
1880	1,858,763 46
1881	2,131,458 87
1882	1,258,056 80
1883	1,155,181 83
1884	304,294 76
Total	9,966,507 29

Total output of Bodie Consolidated Mine to December 31, 1884.

1878	$1,042,236 80
1879	764,067 12
1880	429,817 80
1881	366,105 14
1882	484,890 48
1883	246,820 10
1884	617,310 18
Total	3,951,247 82

SILVER MINING.

Silver mining was almost unknown within the limits of California until the year 1870, when the Cerro Gordo country in Inyo County was discovered, and its ores worked principally by the smelting process. Milling ores were not discovered until several years later. Professor Hanks, in his account of the history of silver mining in California, State Mineralogist's Report for 1884, says:

"There were traditions among the native Californians of silver ores having been found in the country prior to its occupation by the Americans—Alisal, in Monterey County, being the site of one of these reputed silver finds. As these Alisal ores have since been shown to be both poor and scanty, it may fairly be presumed that no argentiferous deposits of any value were ever met with in California prior to its transfer to the United States, and not for about fourteen years thereafter."

Not until the discovery of the Comstock lode in the then Territory of Nevada, with its great promise of silver, was the attention of our people strongly directed to the business of seeking after and mining for that metal; and even after the occurrence of that event most of the explorations carried on and the mining operations engaged in were for several years conducted outside the limits of this State. It was not until the summer of 1861 that the Nevada prospectors for silver, working south from the Comstock lode, made their way over the line into California, the country first explored by them consisting of the territory at present embraced in Alpine and Mono Counties, the still more extensive region lying further south, and now constituting Inyo County, not having been reached until a year or two later.

The silver field covering these several counties includes all that part of California extending from the summit of the Sierra Nevada to the eastern boundary of the State, a tract comprising more than 10,000 square miles, its length being over 200 and its average breadth fully 50 miles. It is an elevated, rugged, dry, and barren region, and except along the easterly slopes of ths Sierra contains very little timber, none whatever suitable for making lumber. It is skirted in part on the east by a high range, the northern extremity of which is known as the White, the central portion as the Inyo, and the southern as the Coso Mountains. This range runs nearly parallel to the Sierra Nevada, Owens Valley, a broad depression over 100 miles long lying between them.

The Sierra Nevada, which walls in this region on the west, consists largely of granite, the other mountain ranges lying farther to the east, being composed of the same rock associated with limestone, dolomite, diorite, porphyry, and syenite; slates occur here, also, in great abundance. The dolomites and limestones appear sometimes capping the higher ridges, while again they occur along the slopes of the mountains in extensive beds alternating with dikes of slate and eruptive rocks. Basalt, columnar in structure, in some places faces the cliffs, while in others the volcanic tufas, weathered into pinnacles and spires, form the crests of the broken and castellated mountains.

Not only the higher mountains and their outlying ridges, but also the isolated foot-hills throughout this tier of counties, abound with mineral veins, carrying both the precious and the useful metals. In some of these veins gold, and in others silver, predominates. Some contain only argentiferous galena, while others carry silver mixed with antimony, lead, copper, arsenic, zinc, nickel, and other baser metals, the presence of which renders these ores exceedingly refractory. While many of these

veins are feeble, much broken up, and contain but little ore, or only ore of a very low grade, others are powerful, regular, and heavily mineralized, carrying large bunches and even considerable bodies of high-grade ores.

San Bernardino County is at present the principal silver-producing region of California. This county extends from the Colorado River on the east to the Sierra Nevada Mountains on the west. Its northern limits border on the lowest depressions of the American Continent, Death Valley and Panamint Valley, and its southern boundary terminates in the Colorado Desert. Its northern part is a region of desolation, in which deserts of sand and gravel and dried lakes alternate with volcanic peaks and ranges of basalt, which seem to have cooled only within a recent geological period. The only oasis in this barren region is the Mohave River, a sluggish stream which is lost in the desert of the same name by evaporation and absorption. The mineral character of the country bordering on this stream was long since suspected, but it was not prospected and developed until within the past four years. During this period a very extensive and promising silver field has been opening up in the Calico and adjacent districts, and indications denote for this region mineral resources of no mean order. They have been almost entirely self-supporting, very little capital having been invested either in opening up or supplying plant to the mines. The ores contain for the most part chloride of silver, easily worked by crushing and amalgamation in pans after the Washoe plan. The veins occur here of all sizes, though the majority of them are rather small. The ores which are found usually in streaks, bunches, and chimneys are of a high grade, and in the claims worked have been found to hold from the surface as far down as developments have extended, between 500 and 600 feet. There are now about 2,000 miners in that region, the most of them working their own claims in a small way, the richness of the ores and the facility with which they can be extracted and disposed of rendering this practicable. At first the ores were nearly all shipped in small lots and marketed in Oakland and San Francisco; now the bulk of them is worked on the ground, the larger companies owning their own mills, of which there are five or six in the county, while the miners sell most of their ores to the custom mills.

State Mineralogist H. G. Hanks, in his official report for 1884, says of this district;

"Calico, the central and principal mining district in this region, is distant about 480 miles southeast from San Francisco and 90 northeast from the town of San Bernardino, the county seat. It is reached by the Southern Pacific Railroad to Mohave Station, and thence over the Atlantic and Pacific Railroad, which traverses the district centrally in an easterly and westerly direction. The Calico mines yield only silver, but some of those in the outlying districts, of which there are several, produce both silver and gold, the ores here carrying also, in some cases, lead, copper, and other base metals, which render them stubborn of reduction. These districts are all included within the limits of the Mohave Desert, a sterile, timberless, waterless region, arid at all seasons and very hot in the summer, the great plain that constitutes this desert being but little elevated above ocean level. As the mines are somewhat more elevated, being situated for the most part in the mountains, the summers here are scarcely so hot as in the plains below. For eight months in the year the climate is pleasant and extremely favorable for the prosecution of outdoor labor, which is little interrupted by cold or stormy weather, there being hardly more than a dozen rainy days in

the course of the year. There is little or no snow in the mines, though it falls to a considerable depth on the higher mountains in the neighborhood."

Calico Mountain is situated in San Bernardino County, on the thirty-fifth parallel of latitude, and Calico mining district is situated in townships 10 and 11 north, ranges 1 and 2 east, San Bernardino Mountain base and meridian. The mountain was named Calico on account of the great variety of colors of its soil. Blue, red, gray, green, vermillion, brown, yellow are distinctly seen in patches along the mountain side, besides a variety of other shades of color. In some places in East Calico portions of the hill-sides look like segments of the rainbow, and have a beautiful appearance when the sun shines upon them in the morning or evening. Experienced miners had passed through these hills many times in the past, but did not suspect the existence of silver. The formation is entirely different in most places from that in which prospectors have been accustomed to find silver ores. A vast amount of surface deposits assay very high and is milled with facility. As far back as 1860, prospectors wandered out from Kern River onto the desert, penetrating the Panamint Valley and Death Valley region. Between these two valleys they found a high and rocky range of mountains, the highest peak of which stands nearly 11,000 feet above the valleys at its eastern and western base. Minerals of various kinds, and of varying grades of richness, were found in numerous places, at that time apparently inaccessible. Then there were no roads reaching across the broad, sandy valleys and table-lands, but few discoveries of water, and those only at long intervals along the trails and Indian foot-paths, that the prospector must follow or perish. One of these early finds was situated at the extreme southern end of the Panamint Range, and now lying some twenty miles east of the old Mojave and Panamint wagon road and about ten miles north of the county line between San Bernardino and Inyo Counties; and long before Panamint was established as a mining camp, a party of men had erected an arrastra and worked a mine at what is now known as Anvil Springs. Who they were or where they went has never transpired. Some have surmised that they were killed by Indians, as human bones, skulls, &c., have been found in that vicinity. That they were Americans was quite evident from the fact that they left a large anvil behind them at the spring that now bears that name.

When Panamint was in its prime a few prospectors, working southward, rediscovered these mines and organized a district during the summer of 1875, giving it the name of Silver Spring district of Inyo County; but as Darwin was then claiming the attention of capitalists, and was much nearer transportation, they were unable to keep up the camp, and it became deserted. Again, in 1880, it was reorganized under the name of the Reyfogle district, and was again abandoned. The history of the discovery of Calico district is narrated in the annual review of the "Calico Print," from which a few extracts are presented.

The first discovery of mineral made in this mining region was some ten or eleven years ago, about 3 miles northerly from Grape Vine Station and the present site of Waterman & Porter's mill, and about 8 miles distant from the extensive mineral belt which surrounds for miles in every direction the town of Calico. The discoverer was an eccentric old man by the name of Lee, who was, it is supposed, killed by Indians whilst on his solitary prospecting expedition some nine years ago in the vicinity of Old Woman Springs. Lee first located on the property now owned by Waterman & Porter, and upon which they keep a fine

10-stamp mill and a large force of men in constant operation. This ledge was worked by Lee for a quicksilver mine, and the rich horn-silver was called by him "pencil lead," he taking the native silver for particles of quicksilver. The work having been abandoned for some two or three years consequent upon the death of Lee, Waterman & Porter, being out in quest of mining prospects, were shown this property by E. J. Miller, recorder of Grape Vine district. Porter, being a practical miner, on his first visit recognized the immense value of the property and immediately commenced making locations. This was in the fall of 1880. During the winter and in the spring of 1881 some hundreds of locations were made in the immediate vicinity, until not a red rock remains but what is well monumented to designate boundaries. Not until the spring of 1881 was there any discoveries made on Calico Mountain. The first location was made by Lowry Silver, a short distance north of where the town of Calico is now situated. The first work of any note that was done in what is now Calico district, but then Grape Vine district (Calico having segregated), was some 4 miles northwesterly from the town on the Consolidated and Pico claims. In March or April the Silver King mine was discovered. After these discoveries many others were made and located. During the summer of 1881 the rich deposits on the Burning Moscow were located. James Parker and Ellie Miller were the sole inhabitants of Calico on the 4th day of July, 1881.

The details of the operations of the various companies operating in the silver-bearing districts are not within the province of an article of a general nature. All that relates to the geological or mineralogical character of the Territory may, however, prove of interest, especially when depicted by mining engineers who have devoted ample time and the benefit of comparative experience to the examination of this new district and novel formation. From one of these reports recently made by Professor Caspari, M. E., on a group of mines in Calico district, the following general information is gleaned:

"The whole region is a barren wilderness. Geological investigators have agreed that an immense inland sea existed in the Pliocene period, extending from the Golden Gate to the base of the Sierras, and beyond and around the extreme southern base, covering what is now known as the Mojave Desert, and connected with the Gulf of California. The climate was tropical, and with an immense rainfall. There was an abundant vegetation, and large rivers existed where we now see the barren mountain sides overlooking treeless plains. The all-powerful force of the glacier assisted by volcanic action changed the whole contour of the country, tearing down mountains or forming new lakes at a much higher level than the inland sea by filling up valleys with their great bulk. These obstructions lasted for ages. In Calico district the result of this last geological disturbance (which created more rounded hills of stratified rocks, and a soil of their *débris* adapted for the growth of plants) are missing. The general surface of the district is broken by spurs which shoot out in varying directions, and which are scored by gulches often presenting almost perpendicular walls over 100 feet high. Everywhere the retaining bars have been broken, leaving abrupt, steep walls of the most grotesque form. The cañons have a trend to the south, their bottoms form very good natural roads, and are used as such for the transport of ore, supplies, and principally water for domestic purposes, from wells sunk on the plains. No water has been found in the hills, and springs do not exist. Nowhere is a spot covered with vegetation; we see nothing but the barren rock.

The formation consists of a metamorphic porphyry of a reddish color, broken by open cleavage of remarkable regularity, which may be easily mistaken for stratification. This rock contains no ore. Overlying this red rock we find a similar rock, but of a whitish color, and of a more earthy fracture, resembling a metamorphic trachyte. This rock contains all the ore in two different and distinct forms. Either the ore is found along the joint planes of the cleavage or in a conglomerate formed by small fragments, cemented together by an argillous earthy mixture of ore and clay. The rock is always barren. The deposit of these ores between the cleavage or in the conglomerate are undoubtedly contemporaneous with the formation of the rock itself. The predominating form in which silver is found here is the chloride or horn silver. No other silver ore is found in any quantity except on a few spots on the cleavage in the Alhambra, a very small quantity of the gray silver ore—sulphuret of silver. Metallic silver has not been found."

Professor Caspari says he has not seen any veins; the ore conglomerate is interbedded in the rock and may be mistaken for main shoots lying conformably to the general plan of mistaken stratification. The ore appears in irregular deposits. Extensive ore-bodies are scattered in all directions, but there is no guide as to where the rich bodies of ore may be met with; they are found on the surface and at 300 or 400 feet below. A single blast may develop rich ore, but the deposits usually large are sometimes of high grade and sometimes low. The working of the mines can be most actively prosecuted; the character of the rock insures complete freedom from interruption by water. Milling has to depend upon wells sunk in the flat, about 3 miles from the mines. The existing mills charge very high rates, viz, $23 to $26 per ton, with a return of 80 per cent. of the assay, consequently only ores worth from $100 to $200 are sent to mills. Richer ores are sold in San Francisco or elsewhere, while the low-graded ores are dumped with the *débris*.

In the extreme northeastern portions of San Bernardino County the Providence range of mountains contains several promising mines, the principal ones being in New York district, situated some 75 miles north of the Mojave division of the Atlantic and Pacific Railroad. This district embraces within its limits of 10 miles square the heaviest timbered and best watered section of the long mountain range of that name. Cedar, oak, and pine trees here attain a height and girth unequaled in the surrounding region. Messrs. McBride and Miller are the principal owners in the large group of mines in New York district. For about ten years they have been doing the assessment work on about a dozen mines besides prospecting carefully, and as a result their dumps are covered with a large quantity of ore, the greater portion of which is low grade, averaging from $40 to $60 to the ton. The mines in this district have large, bold ledges, which indicate permanency, and, judging from the ore uncovered by the numerous prospect holes, there is sufficient to keep a 10-stamp mill in operation indefinitely. This district was visited by the writer in 1877. The formation is near the contact of granitic and limestone rock. The veins are large and well defined, containing free-milling chloride ores, which were graded down to an assumed value of $100 per ton, and worked by arrastra up to 90 per cent. of contents In the same range the Bonanza King Consolidated Mill and Mining Company has been running its mill for nearly two years. The Bonanza King group of mines are well situated for working, being at the base of the mountains, easy of access, and no steep grade for transportation of ores. The mine is now open to a depth of about 600 feet. It is a contact vein, between limestone and

hyry, lying in a matrix, brecciated lime, which composes the vein er, the hanging wall being a soft porphyry, while the foot-wall is rd blue shale. The mineral zone of lime is about 200 to 300 feet , within which the ore lays in chutes or pipes scattered through gangue between the walls. Some ten or twelve of those chutes ped on the surface, and most of the mining down to the third level done on those showing on the surface, but in drifting on the lower l it is found that there are more chutes that did not show on the ace. Cross-cuts have been run on the upper levels of the mine, onstrating that the blind chutes go nearly to the surface. In sink- on the lower levels (6th and 7th) they show that they are as strong the ore fully as rich as on the upper levels. This company, besides original purchase, has expended in putting in the mill and expense orking the mine about $250,000. The mineral zone, on which the anza King property is situated, is nearly 7 miles in length that is ole, and located that distance.

r. J. D. Lynch, of Los Angeles, has recently compiled statistics of production of the precious metals in the southern counties, and in eport to the Board of Trade of Los Angeles says:

During the past three years particularly, exceedingly valuable prop- s have been exploited. This movement has been more marked dur- he last eighteen months. During the last year particularly very active properties have been discovered. The prospects are that ng the year 1885 double the yield recorded for the present year will hronicled. The approximate yield for the past year was—

nza King, Providence Mountain	$750,000
mine, Calico	700,000
eld	250,000
nbra mill and mine	400,000
Beds, ore shipped	100,000
rman mine	500,000
nine, just opening	50,000
tal group of mines	100,000
hipped from Daggett	400,000
mine	20,000
ah mines	150,000
County mines	800,000
ate mines	50,000
andoah and other San Diego mines	200,000
r mines of Los Angeles	100,000
Total	4,570,000

WESTERN SLOPE OF THE SIERRA NEVADA.

lthough gold has been discovered and mined from San Diego County he extreme south to Del Norte County on the Oregon boundary, most prolific source of production has been the central portion of State, extending from Mariposa County northward to and includ- Plumas County, the whole area forming a belt lying on the western r-shed of the Sierra Nevada Mountains, and extending east and from the lava-capped regions of the high Sierra to the foot-hills ering the Saramento Valley.

very stream which crosses this belt has been found auriferous, the ce of the gold being the buried rivers cut through by the intersect- streams, and the disintegrations of the numerous quartz ledges ting the main range. This source of production has long since been usted or mining by the early methods of river-washing rendered

impracticable by reason of the accumulation of tailings from the "hill diggings" worked by the hydraulic or drift process. The main reliance for the future is the opening of the ancient channels covered by lava floors, and the working of the numerous veins of quartz which extend without any material interruption or break from the headwaters of the San Joaquin to the sources, of the Sacramento River, a distance of about 300 miles.

Westerly still of this belt and on the water-shed of the Pacific Ocean, through the drainage of the Klamath and Trinity Rivers, exists another gold quartz region of which but little has been heretofore known.

The Sierra Nevada range terminates in the southern portion of Kern County, where it blends with the coast range at the head of the San Joaquin Valley. The mineral belt of the Sierra Nevada properly commences near Tahichipi Pass. The formation here and throughout Kern County is chiefly granite. The principal centers of quartz mining are Havilah and Kernville, though veins occur in different portions of the county. The result of many years working and the expenditure of large sums of money in exploitation and the construction of expensive machinery has failed to yield remunerative returns, except in a few instances, and then only for brief periods. Hence there has arisen a prejudice against granite as a formation favorable to the continuance of veins in depth, which is not well founded when we take the record of the whole State into consideration. In Kern County the fissures are well defined and continuous, the ore-bodies are variable in width and length. At Havilah they occur in large swells which pinch down to narrow seams, and longitudinally the ore is cut off by a filling of clay. This condition has been unfavorable to deep workings, and many once promising mines have been compelled to close as the expense in deep working exceeds the income. The largest mine in the country, the Sumner, at Kernville, still maintains its production of low-grade ore, which is worked with a small profit at the company's 80-stamp mill. The average yield per ton ranges from $7 to $9. The ledge is wide and the cost of milling by water-power is only $1.75 per ton. The ores contain auriferous arsenical pyrites and some antimony, rendering them refractory, else the expense of mill treatment would be much less.

Proceeding northward the next mineral county is Fresno. Here terminates the granite and commences the slate belt which traverses Central California for nearly 200 miles, including the system of gold-bearing quartz veins known as the Mother Lode. The great outcrops of this lode in Fresno County have long since attracted attention, but it was not until the past year that extensive operations were inaugurated at or near Fresno Flats by a French company who are now erecting works of a magnitude unsurpassed in California.

THE MARIPOSA ESTATE.

The Mother Lode is the principal feature of Mariposa County and was formerly worked on a large scale on the Fremont grant or Mariposa estate. The affairs of the company became embarrassed, principally by bad management, and a long and vexatious litigation ensued which had the effect of closing the mines. During this period the machinery rusted, the buildings rotted, the shafts filled, and the tunnels and drifts caved, towns were nearly depopulated, and mining camps abandoned.

This litigation having reached the highest courts, both State and Federal, and been disposed of finally in the State supreme court, it is

anticipated that operations may soon be resumed. The estate is said to contain within its limits several hundred mines, of which nearly one hundred have been prospected, and several, such as the Princeton, Pine Tree, and Josephine have been opened to a depth of 500 or 600 feet. The ores, according to Prof. William Ashburner, yielded from $9 to $27.50 per ton. The cost of milling at the Benton mill, on the Merced River, was only 60 cents per ton, and the total cost of mining, transportation, and milling $4.57 per ton. The mill had 65 stamps, and was run by water-power from the river by means of turbine wheels. The estate contains many mines of lower-grade ore than the three above named, which can now be worked with profit, as quartz mining has now attained a degree of economy and certainty hitherto unknown.

The whole property is covered with the wreck and ruin of unnecessary so-called "processes," which were both useless and expensive. The resumption of operations would require entirely new plants, and possibly the repair and reopening of the great tunnel from the Merced River, which, when completed, would tap the principal veins at a depth of about 1,200 feet. This in connection with the construction of a railroad along the length of the estate from the mines to the river would assure a great revival of the mining interests of Mariposa County. Mr. Clarence King, the eminent geologist, spent several months upon the estate during the period of its activity. As the property may be reopened, a few extracts from his description of the topographical and geological features may prove of interest.

Through the center of the estate, in the portion occupied by Bear Valley and the Agua Fria, is a broad belt of slates, which is the main geological feature of the region. On each side of this are belts of sandstone, mostly in a highly metamorphic condition; these have again masses of slate outside of them, but of which only very small corners fall within the limits of the Mariposa grant. Subordinate to these belts of sandstone and slate are masses of serpentine and beds of limestone.

The upper or northeastern sandstone range has its maximum of elevation as well as of metamorphic condition towards the center of the estate, in the lofty ridge of Mount Bullion, of which the culminating point is said to be about 5,300 feet above the sea. Near the Merced River, and towards the town of Mariposa, the sandstone is in many places very little altered from its original condition. Along the southern edge of the sandstone belt, and separating it from the slates, is a band of serpentine of varying width, which is seen along the base of Mount Bullion, and from Bullion Knob southeast to Buckeye Ridge and the Crows' Nest. Connected with the serpentine are other magnesian rocks, such as steatite and talcose slates. Two smaller outcrops of serpentine appear near Mount Ophir and Green Gulch mill; these are within the slate belt, and they pass into it through an intermediate stage of talcose slate.

It is in the great slate belt that the larger part of the very numerous gold-bearing quartz veins are found. Mr. King examined about one hundred and fifty outcrops and found the veins in most cases to coincide in strike and dip with the rock in which they are inclosed. The same conditions prevail on the whole length of the Mother Lode which continues almost unbroken through Tuolumne, Calaveras, and Amador Counties into El Dorado County where its identity is lost, though the slate formation continues far north and is particularly prolific in large and valuable veins above Washington, Nevada County.

THE MOTHER LODE.

On the mother lode proper there has been great activity in mining ores, formerly considered as of too low grade to prove profitable. The once prosperous town of Andel's Camp, Calaveras County, which was for many years nearly abandoned, except by a few arrastra miners, has recently attracted the attention of mining capitalists who are now successfully opening mines long since abandoned. The most remarkable examples of profitable low-grade quartz mining are fully detailed in the report of the Director of Mints for 1884, pp. 232–234 and 724.

In Tuolumne County the slates are continuous and may be traced from Jacksonville, on the Tuolumne River, to Jamestown, where they pass under the great basaltic lava flow which constitutes Table Mountain, and reappear on the north side in the cañon of the Stanislaus River, pass through Carson Hill, and extend to Angel's Camp. The quartz vein is massive and nearly uninterrupted except at the point where the lava wall of Table Mountain crosses the formation at nearly right angles. It has been observed that at the points of the widest spread of the main vein of the Mother Lode the rock is either very poor or barren, while the smaller lateral veins are rich and the adjoining slates carry gold diffused in small veins of quartz. In many instances the whole mass for a width of 30 feet is quarried and run through the mills at a trifling expense, realizing fair profits.

It is, however, within the limits of Amador County that the Mother Lode makes its greatest presentation within defined wall structure and has been worked to the greatest profit. The Zeile, Keystone, and Plymouth consolidated companies are at present the most productive, the last named having yielded $600,000 in dividends during the year 1884 from the operations of their 80-stamp mill. The above-mentioned mines have each a depth of 1,000 feet or more, and have many years of reserves developed. The great slate belt is found north of the Cosumnes River, in El Dorado County, but it here ceases to have the distinctive appellation of "Mother Lode."

THE DISCOVERY OF GOLD.

The date of the discovery of gold in California is universally and properly accepted as January, 1848; the locality, Coloma, Placer County, on the middle fork of the American River, now an insignificant viticultural village; and the discoverer, James Marshall. The full details of this event in the history of California, and whose consequences were not only of national import but affected the finances of the world, can be found in the Report of the United States Commissioner of Mining Statistics for 1873, pp. 108–113. Yet historical research has demonstrated that the existence of gold was known within the limits of California nearly one hundred years ago.

Of late years the claim of Marshall as the discoverer of gold has been disputed on behalf of one Peter L. Weimer, an employé of Marshall's. Weimer asserts that it was he, and not Marshall, who first observed the shining nugget, but Marshall having a horse at his disposal rode to Sutter's Fort (now Sacramento) to submit the unknown metal to a test. On one point both narratives agree that Marshall and Weimer were in company when the nugget was found. It is very clear, however, that neither Sutter, Marshall, nor Weimer were convinced of the genuineness of the "find" until it had been tested in San Francisco and pronounced gold.

The discussion of the rival claims of the discoverers has elicited many

reminiscences of earlier times which are deserving of being put on record as a portion of the history of the State. General M. G. Vallejo, who came to California about the year 1810, and whose remarkable and unimpaired memory is still a ready reference on all questions of local or general interest connected with the earlier annals of California, says that in the year 1824, while on a military expedition to the region of the Tejon, Tehachipe, Kings, and Kern rivers, now Kern and San Bernardino Counties, he found a Russian living there at a point between the two last-named rivers, who then was and had been for some time mining for gold. He was supplied with all then known appliances for separating the precious metal. About the same time and for some years later General Vallejo used to remit gold dust to the authorities at the city of Mexico in sealed quills of the vulture.

Capt. Walter Comstock, a whaler in the employ of the Grinnells of New York, has asserted that he brought gold from California in 1824, and nearly every vessel which put into the harbor of Yerba Buena (now San Francisco) carried off some samples of the metal then suspected to be gold. There existed a few years ago (and perhaps now) in the museum of the Guadalupe Friars at Zacatecas, Mexico, a gold nugget, the size and shape of a pigeon's egg—a very common form of occurrence—that was alleged to have been brought from California by one of the friars in the year 1825.

Prof. Henry G. Hanks, State mineralogist of California, in his report for 1884, pages 217, 218, says:

"Of the placers discovered here in early times one was located near the Colorado River, San Diego County; this, the first found, having been discovered in 1775. The site of this find is embraced within the limits of what is known as the Carga Muchacho mining district, located about 15 miles a little north of west from Fort Yuma, situated on a dry mesa, with no water nearer than the Colorado River, 12 miles distant to the southeast. It is not probable that this placer was ever worked much, though some gold has been gathered there of late years, the miners taking advantage of the little water afforded by the winter rains, in that region very scanty. Some dry washing with machines has also been practiced at this locality. The quartz lodes, numerous in the neighborhood, were undoubtedly the primary source of these placer deposits. These lodes are quite rich in gold, as is shown by the production made by the Yuma Mining Company, who put up a mill there several years ago and had, prior to June, 1882, taken out $167,000 from 14,000 tons of quartz. With even a moderate supply of water this placer, though not very extensive, could no doubt be worked with profit."

The next discovery of this kind occurred fifty-three years later at San Isidro, in the same county, gold diggings having afterwards been found on the upper waters of Santa Clara River, and still later in the San Fernando Mountains, both in Los Angeles County. These San Fernando diggings were worked steadily in a small way for twenty years, not having been wholly abandoned until the spring of 1848. Here considerable gold dust was taken out, to the value, probably, of $150,000 or $200,000. From the other placers mentioned, however, very little was ever collected.

It is a singular fact that two centuries before the authentic knowledge of the existence of gold in California the country had a somewhat mythical reputation as a land containing the precious metals in abundance. These reports were mainly propagated for selfish or mercenary motives. An old work published in Europe in the sixteenth century says:

"The soldiers of Vasquirus Coronatus, having found no gold in

Vivola, in order not to return to Mexico without gold, resolved to come to Quivera, California, for they had heard much of its gold mines, and that Tatarraxus, the powerful king of that country, was amply provided with riches."

Sir Francis Drake, who in 1579 visited this coast and entered the bay which now bears his name, on his return to England gave such a glowing account of the country that Hakluyt, a historian of that day, in writing about it, remarks that there is no part of the earth here to be taken up wherein there is not a reasonable quantity of gold or silver, this being said about the district lying adjacent to Drake's Bay, in which no trace of the precious metals has ever been found.

THE GOLD REGION.

The great auriferous belt of California extends from the mountains bordering the Colorado desert on the south to the Trinity Mountains on the extreme north, where it terminates on the shore of the Pacific Ocean, in the so-called "gold bluffs" and "gold beaches," which will be noticed in detail in this article. The gold-bearing region of California is not exclusively confined to the western slope of the Sierra Nevadas, nor can any exact line of division be drawn separating the silver-bearing districts from those which produce gold, but by far the larger portion of the royal metal has come and is still being produced from the lower portion of the flanks of the Sierras. It is true that the precious metals have been found in the coast range mountains, but not in sufficient quantity to justify permanent working. The principal auriferous territory, and that which comprises a large proportion of the population and the greater portion of the mineral wealth of the State, occupies the western portion of the counties of Mariposa, Calaveras, Amador, El Dorado, Placer, Yuba, Butte, Nevada, Sierra, and Plumas, all of which are situated on the eastern side of the two great drainage rivers of the State, the San Joaquin and the Sacramento.

In the extreme southern portion of the gold region beyond Mariposa County the slates almost cease to form the continuous belt "Whitney," and they are more and more encroached on by the granite going southerly. In fact there is a gradual decrease in the width of the auriferous formation proper from the north toward the south, and a constant increase in the amount of metamorphism displayed, the granite occupying a larger portion of the mass of Sierra, and descending lower down on its flanks, while the crest of the mountains become more and more elevated, its culminating points being in about the latitude of Owens Lake in Inyo County.

QUARTZ MINING.

One of the principal sources of the gold yield of California is the working of auriferous veins of quartz. These veins are found throughout the State in nearly every lithological formation, but are worked to the greatest extent in the counties of Tuolumne, Calaveras, Amador, El Dorado, Nevada, and Sierra, on the western slope of the Sierra Nevadas. To the east of the Mother Lode there exists in the higher regions a belt of veins in the granite formation, which, though not continuous or connected, have produced several groups of rich quartz veins, as at West Point and Sheep Ranch districts, in Calaveras County, Confidence and Enterprise, in Tuolumne, and near Volcano, in Amador County. These back veins as a rule are narrow and inclosed in hard walls, either of metamorphic slate or granite; but as a compensation

for these disadvantages the quartz is of high grade, ranging from $20 to $100 per ton. The ores are freely permeated with sulphurets in some form, composed usually in these upper regions of iron pyrites and galena, and prove somewhat refractory in treatment, requiring sometimes roasting before treatment.

The quartz mines of California are usually owned and managed by individual owners, local companies, or by close corporations, who are reticent in giving the result of their operations and yield. None of the gold quartz mines, except those of Bodie district, and but two of the silver-bearing mines have ever been listed on the stock boards, so that complete results of their working are not available to the public; therefore any statement of the profits realized, or dividends paid, would be so incomplete that it would not be worthy of publication.

That the condition of quartz mining in California during 1884 has been one of unprecedented activity and prosperity is manifested by the steady increasing construction of mining machinery, the building of ditches to utilize water as a motive power, and the larger output of bullion from the quartz districts. This result is to be attributed to several reasons, among which are the cessation of great speculative operations in the stock of the Comstock mines, which formerly diverted millions of dollars of our capital from legitimate mining, the discarding of "processes" for the treatment of ores, the increased efficiency of mining machinery, and the application of water instead of steam for running the hoisting, pumping, and milling machinery of the mines.

In Nevada County the leading districts, Grass Valley and Nevada, still maintain their supremacy as great quartz mining centers. The shipment from Nevada City in 1883 amounted to $1,597,981, while in 1884 it was $1,116,754, a decrease of only $481,227. The falling off is to be accounted for by the total suspension of hydraulic mining for several months past, or since the Sawyer decision. Formerly, and indeed within a year, the yield from gravel mines in this locality largely exceeded the yield from quartz mines; but since then the cutting off of the former has been, as the figures show, in a great measure compensated for by the increased output of the latter, and now the prospects are that during the current year the county will produce nearly as much gold as it did last year.

The success of the Idaho, the leading mine of Grass Valley, in their change from the use of steam to the application of water as a motor, although it was attended by an outlay of nearly $60,000, has prompted other leading companies to follow the example, and resulted in the organization of a company who are about to carry out an enterprise which will have for its object the furnishing of water-power for the mines at Union Hill, Ophir Hill, along the banks of Wolf Creek, and along the west side of that stream. Supplying the Empire Company is the first object in view, but the pipes will be of sufficient dimensions to carry water to all the points mentioned. The water supply will be obtained from the South Yuba Canal Company, and will be taken out at a point near the large reservoir at the foot of Banner Hill. From thence it will be conveyed in pipes, 25½ inches in diameter, by way of Union Hill, to Ophir Hill, the distance to the latter point being over 2½ miles and the fall 400 feet. The pipes will have a carrying capacity of 800 cubic inches. At Ophir Hill connection can be made with the Magenta mine, and on Wolf Creek with the whole series of mines in that part of the district, some of which would obtain the water under a pressure of over 500 feet. The organizers of this enterprise have satisfied themselves that they will find a market for this water-power, as it will be so much cheaper

than steam that no operating company will fail to avail itself of this motor at the earliest opportunity, and the owners of a number of properties now idle would be encouraged to undertake operations that the cost of steam plants has heretofore forbidden. It is expected also that the power will be the means of starting custom milling on a large scale, as the cost of reduction can be brought down to at least one-half of the present rates, which will be a very important item to prospectors as well as companies conducting work on a large scale. That it will work a very great and important change for the better in carrying on mining in the district is a self-evident proposition, and that a largely increased output of gold will follow is a matter of course. Contracts have been made for the water supply and the laying of a pipe line to the Empire mine on Ophir Hill, and the water will be brought to that point early in the spring of 1885.

The Empire mine has been one of the steadiest and most reliable gold producers of the district and can readily afford to control, if not wholly construct, this important work. The operations of the Idaho mine having been given in detail in another portion of this report, the following comparative statement of cost and product only are presented:

Statement of operations of Idaho mine, Grass Valley, Nevada County, California, for the years 1883 *and* 1884.

Operations.	1883.	1884.
MINE.		
Average number miners per day	216	158
Miners' wages per day	$3 00	$3 00
Sinking per foot, depth 1,100 to 1,200 feet levels	$25 00	$25 00 to $32 00
Drifting per foot, lower levels	$9 00	$9 00
Mining and milling per ton	$9 21	$7 86
Tons extracted for the year	28,572	31,143
Average yield per ton	$12 76	$18 04
Percentage of sulphurets, about	1	1
Total bullion product	$364,599 00	$550,061 00
MILL.		
Power	(*)	(†)
Number of stamps	85	85
Weight of stamps, in pounds	850	850
Drop in inches	9	9½
Drops per minute	70	72
Method of concentration	(‡)	(‡)
Cost of mill, exclusive of repairs	$40,000 00	$40,000 00
Capacity for twenty-four hours, in tons	100	100
Cost of milling, per ton	(§)	(§)
Tons milled during year	28,572	31,143

* Steam. † Water. ‡ Cornish buddle. § Not segregated.

The record of years 1883 and 1884 are given in above table because in 1883 the works, hoisting, pumping and milling, were run partly by steam and partly by water, but in 1884 water was the only motive power.

The leading mines of Nevada and Grass Valley have been so often described in former reports that anything more than allusions to them here would be in the nature of repetition, and therefore superfluous. The details of their operations for the year 1884 are published in this report under the title of "California." The new discoveries of Trinity County are noticed under heading of "Northern California."

In the higher portion of the county, 20 miles east of Nevada City, there exists a belt of quartz ledges which have been heretofore in a

great measure overlooked, or at least worked on a small scale. This is known as Washington district and has been ignored until the past three or four years. Recently it has attracted the attention of the prospector, miner, and capitalist and now promises to rank among the permanent districts of this portion of the State. The writer of this article visited the district in 1877, when there was only one mine actively at work. The number of mines in the district did not then exceed fifty, and but one mill was in operation. Now there are several mills running with profit to the owners, and more than four hundred men are employed. A recent visitor says of this district:

"It seems to be the culminating point of a rich mineral belt at least 80 miles in length, being on the contact of the slate and granite formations, which form the geological structure of the country for the entire distance mentioned, including Calaveras, Amador, El Dorado, Placer, and other counties. The veins are large, being from 5 to 15 feet in thickness, with a yield from $10 to $50 per ton. There are a multitude of good prospects, the veins as yet not much developed, where the ore will yield by ordinary milling process from $3 to $5 per ton. The facilities for working are remarkably good, the whole belt being covered by a forest of the very best timber for mining purposes and practically inexhaustible, while the water from the South Yuba River and from the great ditches and canals which formerly supplied the hydraulic mines is now made available to run quartz mills and hoisting works to develop the auriferous ledges. In the district are six mills of from ten to twenty stamps each. At least two or three of the mines have taken out, in sinking shafts and running, enough bullion to pay the expenses of sinking. In the spring more stamps are to be added to some of the mills already there and additional mills are being arranged for. When the fact is considered that this ore can be milled for $1 per ton it will be readily seen that the mines are of great value."

The low-grade quartz mines of the State, as manifested by their production, the magnitude of their operations, and their permanence both in length and depth, are the Plumas Eureka and the Sierra Buttes, both situated in Sierra County. These mines have been continuously worked with profit for thirty year and are now developing more ground which promises to give them an indefinite continuance of their career. These mines are situated about 7,000 feet above the level of the sea. Their veins, which are of great width, are found in metamorphic slate and are opened through a succession of tunnels on the mountain side above the Yuba River. The mills are so situated as to command an ample supply of water for power. Their record for 1884 is presented in the following condensed statement:

Statement of the operation of the Plumas Eureka mine, Plumas County, California, for the year 1884.

MINE.

Company or custom mill: Company.

Average number of miners	per day..	225
Miners' wages	per month..	$65 00
Mining, including dead work	per ton..	3 52
Milling	do....	$0 49¼
Amount extracted and worked for the year	tons..	55,778
Average yield	per ton..	$6 72
Sulphurets	per cent..	1

MILL.

Power: Water and steam. Method of treating sulphurets: Roasting, grinding, amalgamation.

Number of stamps		60
Weight in pounds		750
Drop in inches		8½
Drops per minute		80–85
Capacity for 24 hours	tons..	153
Cost of treatment	per ton..	$0 49½
Crushed during year	tons..	55,768

The cost of mining includes the sinking of two shafts below tunnel level; one engine and pump on each shaft run by compressed air and steam carried in from surface in 3½-inch pipe, one shaft being situated 3,500 feet from mouth of tunnel and the other 5,000 feet. Cost of mining also includes cost of management.

Statement of the operations of the Sierra Buttes mine, Sierra County, California, for the year 1884.

MINE.

Company or custom mill: Company.

Average number of miners per day		265
Miners' wages	per month..	$65 00
Mining, including dead work	per ton..	$4 37
Milling	do....	$0 53
Amount extracted and worked for the year	tons..	47,616
Average yield	per ton..	$6 18
Sulphurets	per cent..	1

MILL.

Power: Water. Method of treating sulphurets: Roasting, grinding, amalgamation.

Number of stamps		90
Weight in pounds		750
Drop in inches		7½
Drops per minute		84
Capacity for 24 hours	tons..	170
Cost of treatment	per ton..	$0 53
Crushed during year	tons..	47,581

The cost of mining includes between 70 cents and 80 cents per ton "dead work," outlay on a deep and at present unproductive tunnel. The cost of management and office expense is also included.

For three months 50 stamps were running, for three months 70 stamps, and for the other six months 90 stamps were at work on the mine.

The stagnation in the quartz-mining industry, which prevailed until within the last few years, may in a great measure be attributed to the successive mistakes and disasters which followed the business from its inception until lately, and which were graphically described by Professor Ashburner twenty years ago in his report to J. D. Whitney, State geologist.

Almost every new-fangled idea, in the way of crushers and amalgamators, has been at one time or another thoroughly tried, and in most cases with more loss than gain. There seems to be a mania among inventors for trying their skill on matters of which they know little or

nothing, and in no department of the mechanical art has this been more conspicuous than in that which relates to the treatment of auriferous quartz. It would require volumes to describe all the ingenious but perfectly useless contrivances, each of which has in its day been considered as about to revolutionize the quartz business; these have nearly all either entirely disappeared, where there was luckily a foundry near enough to make the metal of which they were constructed available as old iron, or else lie as heaps of rubbish about the premises of the too confiding miners.

Of late years, however, the general results that have attended the business throughout the State have been very satisfactory. Under the stimulus of capital a very notable progress has been achieved. Work upon many new mines has been commenced, while that upon those previously opened has in a large number of cases been pushed with energy. New improvements have been introduced and important economies effected, bringing the business within more fixed and scientific principles and placing it every way upon a more eligible basis. The mines, as penetrated to greater depths, have generally been found to yield ores in greater quantity and enhanced value, a circumstance that has tended much to confirm the high opinion entertained of their permanency and worth. In short, it may be truly said the results of the year just closed have met every reasonable expectation. There have been some cases of disappointment and loss, but quartz mining does not claim to have been raised to a place among the exact sciences. The lessons of the past have not, however, been fruitless, and the future of this class of mining was never more promising than with the close of the year 1884.

NORTHERN CALIFORNIA.

The falling off in production of the gold-bearing quartz mines on the eastern slope of the Sierra Nevadas, of which Bodie district was for many years the principal producer, turned the attention of the prospector and miner to new fields of exploration which promise to compensate for the decaying wealth of Bodie. The site of recent discoveries is in the northwestern part of the State on the water shed of the Trinity and Klamath Rivers. Of this region, Professor Whitney, formerly State geologist, says in his Geological Reconnoissance: To the west of the volcanic plateau (referring to the lava fields emanating from Lassen's Butte and other volcanic cones in its vicinity), in portions of the counties of Siskiyou, Del Norte, Klamath, and Trinity, there is a very large area covered by the auriferous slates in part, but where granitic and granite rocks are more exclusively developed than in the more southern part of the gold region. This is the site of the recent discoveries on New River, a tributary of the Trinity, which is now attracting so much attention throughout the State. It is but recently that vein mining has been prosecuted in this locality. The district was discovered and brought into notice by Mr. Stephen Sherwood, a forty-niner frontiersman and prospector, who drifted from place to place in search of new discoveries. He discovered Meadow Valley, Pioche, and many other valuable districts. While in the vicinity of Shasta this mineral belt attracted his attention. He followed it until he camped in what is now known as the New River district. He made some locations, communicated his find to his friends, prospectors came in who discovered the Mountain Boomer, built an arrastra, and in a short time ground out $11,000 with a profit over all expenses of $8,000. The inhabitants of the lumber region of Humboldt County heard of the strike

and exchanged their saws and axes for picks and shovels and came in by hundreds. They formed a district, commenced prospecting, and soon discovered veins of quartz of which quite a number have developed into valuable mines. The mines were discovered in the summer of 1884 and, but little development work of any description has been done upon them. Enough has been shown, however, to warrant the belief that a district of some value has been found, and no doubt a great many men will go there in 1885. There is quite an extent of country to be prospected. The ledges run at right angles with the vein, and it is thought that for some 60 miles, more or less, mines will be found.

NEW RIVER QUARTZ DISTRICT.

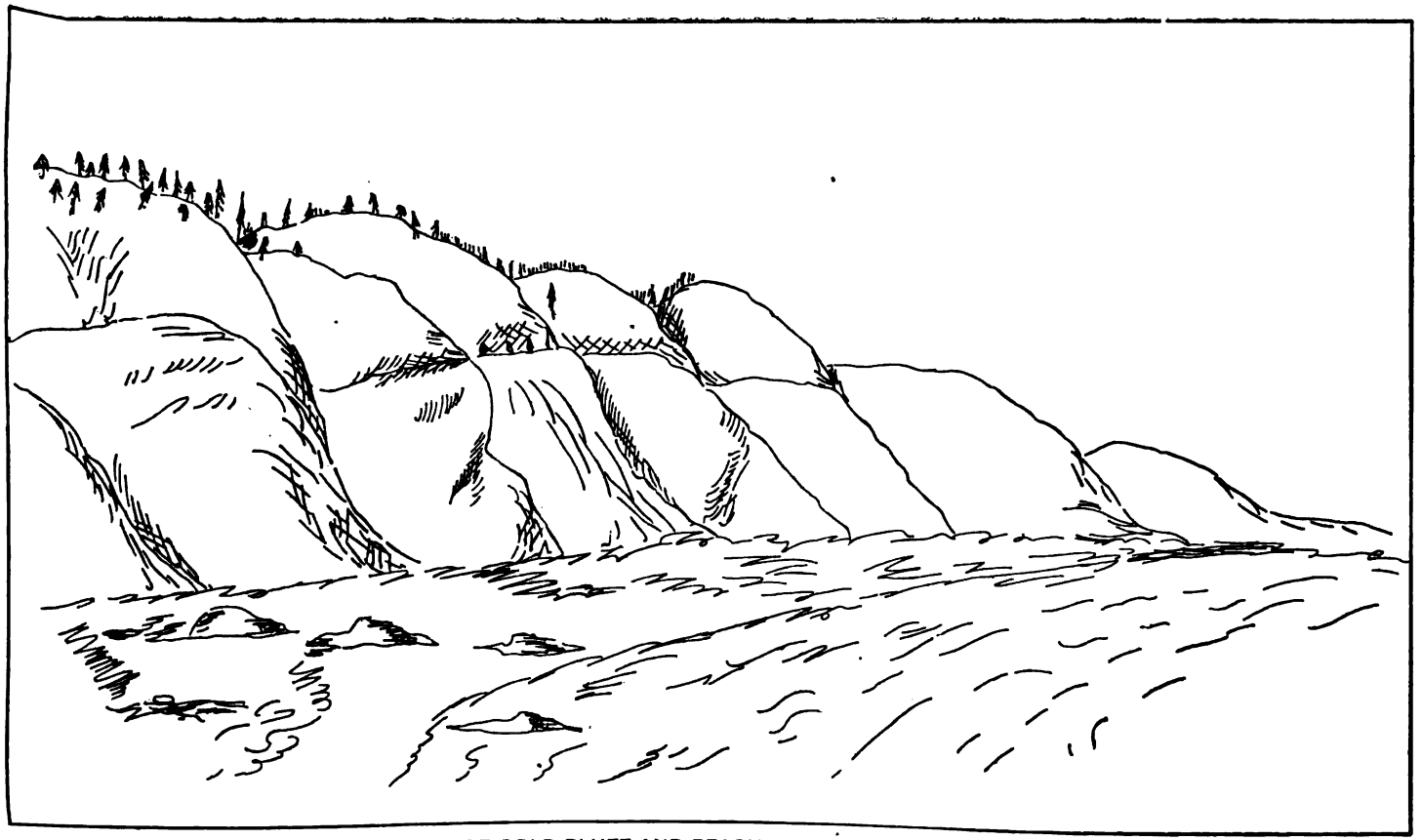
New River mining district is situated on the headwaters of the tributaries of New River, a branch of the Trinity. It takes its rise in the Salmon range of mountains, the dividing ridge between the waters of the Trinity and the Klamath Rivers, and at a point where Humboldt, Siskiyou, and Trinity Counties meet. New River City, the principal mining camp, is 45 miles as the crow flies from Eureka, at Humboldt Bay, but by trail it is 90 miles. Weaverville is distant 60 miles. Both routes are at present over trails. The topographical features of the northern portion of Trinity County, in which we find this new district, are strongly marked, and show evidence of, at no remote period, violent volcanic activity, upheaved regardless of order or system, tossed and tumbled into every conceivable form.

The main mineral belt in which the mines of New River district occur varies from 3 to 4 miles in width, and on its line of strike in a northwesterly and southeasterly direction is traceable for a distance of more than 60 miles.

Enterprise district, situated 30 miles southeasterly from New River district, on the east fork of the Trinity, is on the same formation; thence following the belt we reach the rich mines and placers contiguous to Weaverville and Shasta. This belt is composed of slate, serpentine, and allied metamorphic rocks, with intrusive dikes of diorite, greenstone trap, syenite, and porphyry. The veins are, as a rule, small, varying from a few inches to several feet, the gangue, ferroginous quartz, carrying free gold—the line of decomposition probably extending to a considerable depth. The altitude being about 4,000 feet the snows of the winter soon melt and run off. The side hill is densely covered with timber, fir, pine, and oak. The branches of the streams all carry running water. Water for motive-power is obtainable in the creeks in near proximity to the mines.

The beds of Slide and Eagle Creek, immediately below the newly discovered mines, are virgin for a distance of 6 or 7 miles—a good field for the placer miner, as the north fork of the New River, below the junction of these two streams, has been extensively worked with results of 1 ounce per day to the man, with an occasional big nugget and rich strike. It is reasonable to infer that the intermediate ground immediately below the rich veins recently discovered should be correspondingly rich in placer gold. The depth of the soil, together with the dense growth of heavy timber, has heretofore deterred the prospector from testing these grounds.

Since the closing down of so many mines in the central counties, the Trinity, Salmon, and Klamath Rivers, in the northwestern part of the State, are likely soon to become the active centers of hydraulic operations, there being no likelihood of such operations ever being there in-



SECTION OF GOLD BLUFF AND BEACH, HUMBOLDT COUNTY, CAL.

H. Ex. 268

terfered with by judicial proceedings. The waters of these rivers find their way to the ocean through deep, narrow cañons, along which there are no farming lands of any extent, none whatever so situated that they can receive any damage from the hydraulic slums. As these streams are not navigable, and the Klamath, which receives the waters of the other two, debouches directly into the ocean, there being no bay or harbor at its mouth, no injurious filling up or shoaling can there result from these slums, however great the quantity discharged from the hydraulic mines. The auriferous gravel banks along the Klamath, are said to be very extensive, occurring in bars and bunches for many miles on either side of that stream. These gravel deposits are rich in gold, and enjoy entire freedom from the volcanic ash and lava flows that so encumber many of this class of deposits further south, rendering the working of them by the hydraulic process difficult and expensive or preventing it altogether. Water in great abundance can be introduced upon these Klamath mines at little cost. They can also be outfitted at small expense, lumber in that country, which is everywhere well timbered, being extremely cheap. The winters are mild, it being possible, so far as climate is concerned, to continue gravel washing the year round, as has been done in the past. A good deal of attention is now being turned to this section of the State where a number of important hydraulic enterprises are contemplated in the near future.

GOLD BLUFFS AND BEACHES.

There exists on the shores of the Pacific Ocean near the mouth of the Klamath River, in Humboldt County, a large area of beach containing more or less gold in the beach sands. The auriferous character of these sands has been known since an early period in the history of mining in this State. They have been worked in a desultory manner by crude process for many years without any remarkable success. During the last two years, however, more systematic working has been inaugurated, and the industry promises to become an important one. This gold region has lately been visited by Mr. H. W. Chase, of the United States Coast Survey, and also by Dr. John W. Hood, of San Francisco, and James H. Crossman, M. E. The detailed description of the observations and experiments of these gentlemen throw much light on the character of this gold field, its formation, and the method of working pursued for saving the gold.

Mr. Chase describes the coast line coming from the north after leaving the Klamath River as being extremely broken and rocky; at a point about 4 miles south of the river banks deposits of sand appear, although the commencement of the bluffs proper is at the mouth of the Ossigan Creek, and 7 miles from Klamath River, for 8 or 10 miles there is an almost unbroken line of gravel cliffs varying from 100 to 500 feet in height; many of the bluffs are absolutely vertical and in some instances overhanging. The mountains back of this sea escapement are all one immense mass of gravel of varying size, and distinctly marked in layers or stratifications. This gravel can be traced across the country, northeastwardly, to a point on the Klamath River about 30 miles distant.

The average height of this cliff above low water-mark is about 200 feet, composed of auriferous loam, clay, gravel, sandstone, cement, &c. The cliff described is at the lower end of the bluffs and near the mining works. The sand is placed in an inclosure called the sand corral. A large lagoon near by furnishes the water for separation, supplied by a

stationary engine and force-pump. The washing is done in long toms with silver-coated plates on which quicksilver is applied. During the week of his stay in a seven days' run they cleaned up and retorted from the two machines in use $1,000.

The experience of the successive proprietors of this extraordinary gold deposit proves that immediately after a heavy cave or slide of the bluff the beaches are richer and its gold coarser, and it is strange that up to the present time no artificial means have been resorted to in the way of blasting down the cliffs or undermining them by hydraulic process to enrich the sands of the beach. The sea working ceaselessly night and day is the great natural disintegrator, pulverizer, and crusher, as well as the concentrator of the precious metals from the immense deposits contained in the bluffs, and man has but to gather the results of nature's unceasing and tireless work. Many ideas have been advanced as to the possibility of gold in quantities and coarser in character being found beyond the surf line, predicated on the fact that in conjunction with black sand gold has been repeatedly brought up from the bottom of the sea by the sounding leads of sailing vessels.

Dr. Hood is of the opinion that the bluffs have been the outlet of some ancient river, probably those now known as the Klamath and Trinity Rivers, which take their rise above the great auriferous belts of California and Oregon, carrying in suspension immense quantities of auriferous gravel, depositing it along its course, eventually filling up the different estuaries or deltas which, owing to some great volcanic disturbance, became what is known as "The Gold Bluffs."

That this theory is correct is proved by the fact that the timber on the bluffs and along the course of the gravel of the old river bed is of more recent growth than that of the outside belt, and in the face of the bluffs in many places are found trunks and stumps of the California fir in a partially fossilized or carbonized condition. None of these trees are found growing within 50 miles of the bluffs.

The method of working the beach sands and bluffs is similar in all the claims, and is described by Mr. J. H. Crossman; the system of working adopted is as follows:

When rich deposits or concentrations are seen on the beach by men in the company's employ notice is sent to their station, and men and mules with sacks (*alforjes*) are dispatched to gather them, but, owing to a want of system or tardiness in arriving, frequently large portions are temporarily lost from the effects of the incoming tide and surf, which bring fresh accumulations of auriferous material, covering the concentrations, or the strong undertow may take them seaward and break up the deposit. It is not an uncommon thing to gather 100 tons of these sands in a day, providing everything is favorable. The average, however, is 10 tons, with an average value of $5 per ton, though the average assay value is much higher.

The company employ from 5 to 10 men as they are required, paying them $40 per month and board. When short of men they employ Indians; their pay when working is $1 per day. When the men are not employed in working the sands at the canal they examine the beach for fresh deposits.

The Union Gold Bluff Placer Company use water pumped from the ocean in their machines. Fresh water would be better, as salt water is objectionable on account of its specific gravity being greater than that of fresh and more readily carrying away the light, scaly particles of gold in suspension. The amalgamation at Gold Bluff is imperfect, and the loss of gold must be great. The machine in use is the ordinary long tom,

12 feet in length, with hopper of sheet-iron, coarse holes. The sand is shoveled into the hopper, 15 miner's inches are turned on; from the hopper to the copper plate is a drop of 5 inches. The plate is 4 feet long, which is charged with quicksilver from a bottle as often as required. From the bottom of the tom the pulp passes off, is forced through a reservoir of quicksilver, thence to the dump. The proportion lost is probably greater than the amount saved.

The gross proceeds of the Union Gold Bluff mines from January 1, 1875, to January 1, 1883, were $147,733.16, and the expenses for the nine years averaged $6,000 per year, or $54,000, leaving the company a net profit of $93,333.16. Dr. Hood has specially examined the Pioneer ground, which is of the same character as the Union. From his report the following extract is presented:

"The property has not been worked as an hydraulic mine, but for the past twenty-five years has been successfully operated as a beach mine; that is, gathering the auriferous sand found at the base of the bluffs after stormy weather has broken them down, and saving by amalgamation the gold therein.

"It is estimated that but a small percentage of the gold which was washed out of the bluffs has been collected, as the main portion is washed away to sea, where, by action of the currents, it is distributed along the coast for hundreds of miles. Notwithstanding this rude method of collection, over $1,500,000 have been collected on the beach from both bluffs, more than half of which came from the upper or Pioneer Bluffs.

"The gravel has an average depth of 200 feet, at least, from surface to bed-rock, all being auriferous, and yielding on the average 20 cents' worth of gold to the cubic yard. Some streaks are very rich, giving $135 per ton by actual working. There is no top-soil to speak of—gold from the grass down—no large bowlders; very little cement or clay. The gold is fine, but easily saved in the sluices, and averages .957 fine."

This form of deposit and class of mining is not wholly confined to the beaches of Oregon and California, but is carried on extensively in New Zealand, and is described in an English work entitled "Gold; its occurrence and extraction," written by Alfred G. Lock, F. R. G. S., and published in London, 1882 (p. 526).

RETROSPECTIVE REVIEW.

The condition of mining, with the sole exception of the uncertain status of hydraulic mining, may be summed up as one of unusual prosperity and great promise for the future. The drift mines of Sierra, Plumas, and Placer Counties have more than maintained their annual production, as will appear by reference to the details under the general title of "California," and many miles of new territory are being opened by long tunnels. The output of the silver mines of San Bernardino County has been a matter of surprise to the most sanguine owners, and yet promises to be rivaled by new discoveries in Shasta County. The business of the foundrymen in the construction of mining machinery for use in this State has been unprecedented. Most of the large orders emanate from the owners of so-called low-grade quartz mines, which have heretofore been worked only for pockets by tracing small veins. Under the present system the whole mass, sometimes to a width of 100 feet, is milled, and if the ore yields $3 per ton the owners realize a fair profit with a large mill. The leading operators of California have abandoned distant fields and are now seeking to develop the resources of their own State.

PRACTICAL HYDRAULICS AS APPLIED TO THE MEASUREMENT OF WATER IN MOTION, TO MINING AND OTHER INDUSTRIES.

By P. M. Randall, C. E., *San Francisco.*

The commercial value, as well as the physical properties of water, renders a knowledge of the manner and means of measuring its flow correctly, under different conditions, highly important to all concerned in its industrial uses.

The miner asks how many cubic yards of earth, gravel, or tailings a given quantity of water employed under certain conditions will break down, wash out, or remove; the farmer inquires how much land can be properly irrigated with the same or certain other quantity of water; while the manufacturer and millman seek to know what quantity of water falling vertically by the force of gravity through a given distance will develop a definite amount of mechanical power.

The determination of the quantity of flowing water is common to the various industries, but independent of the uses to which the water shall be put.

The present article has been prepared with the view of answering in the most simple and efficient manner, these questions with respect to the measurement of water in motion; as through vertical openings, over veins, in pipes, in canal, or ditches, in natural streams and through nozzles; with respect to the quantity of water required for various mining purposes, and for the purposes of irrigation; and with respect to the power of water as a motor.

In mining operations, the measure of the flow of water is usually expressed either in cubic feet or in miner's inches. In computing the accompanying tables, the unit of measure adopted is one cubic foot flow in a second of time.

MEASURING DEVICE.

The device for the measurement of the flow of water, mostly employed in the mining regions of California consists of a large wooden box a foot or more in depth, according to the requirements, in one end of which is a rectangular discharge opening whose width should not exceed one-half the depth of water below it. Above this opening is a head-board, adjustable like a vertical gate, by means of which the size of the opening can be increased or diminished.

Head.—The sum of the vertical width of the head-board and half the vertical width of the discharge opening is equal to the head or pressure under which the water is measured.

The thickness of the sides of the opening, varies in different measuring devices, from 1 to 3 inches. The surface of the water, in its passage through the box, is kept at the level of the top of the head-board. Care should be taken that the discharge velocity shall not be affected by the velocity of the approaching stream.

APPLICATION OF THE VERTICAL MEASURING DEVICE.

(1) Assume the discharge opening 50 inches long, 2 inches wide, and the width of the head-board 3 inches; then will the area of the discharge opening be $50 \times 2 = 100$ square inches.

Half the width of the opening is $2 \div 2 = 1$ inch. The sum of the width of the head-board and half the width of the opening is $3 + 1 = 4$ inches head.

The measure of the water thus passing through the box is termed 100 "inches under a 4-inch pressure."

(2) Assume the discharge opening 50 inches long, 2 inches wide, and the width of the head-board 6 inches; then, as in the preceding case, will the area of the opening be 100 square inches, while the head or pressure will be $6 + 1 = 7$ inches.

In this case the measure of the flow of water is termed 100 inches under a 7-inch pressure.

(3) Assume the head-board 7 inches wide, and let it be raised until the width of the discharge opening, 50 inches long, shall be 4 inches wide; then will the area of the opening be $50 \times 4 = 200$ square inches; half the width of the opening will be $4 \div 2 = 2$ inches, and the sum of the width of the head-board and half the witdh of the discharge opening will be $7 + 2 = 9$ inches head.

In this case the measure of the flow of water is 200 inches under a 9-inch pressure.

Thus it is seen that the flow of an inch of water is variable at the pleasure of the parties concerned with respect to it.

MINER'S INCH.

In California the term "miner's inch" is employed to express that quantity of water which under a given head or pressure, as 4, 7, 9, &c., inches, will flow through each square inch of the discharge opening; or, in other words, which will flow through each square inch of cross-section of a stream of water.

The quantity of water so flowing in a minute, an hour, twenty-four hours, &c., is designated "minute inch," "hour inch," "24-hour inch," &c., according to the length of time specified.

Statutory miner's inch.—Under the head "Water rights" the Civil Code of the State of California, section 1415, provides in these words: "That he [the locator] claims the water there flowing to the extent of [giving the number] inches measured under a 4-inch pressure."

On these data, the value of the statutory miner's inch is as follows:

	Cubic feet.
For one second, "second inch"	0.02
For one minute, "minute inch"	1.20
For one hour, "hour inch"	72.00
For twenty-four hours, "24-hour inch"	1,728.00

If a cubic foot be divided by the flow in one second, there will result the number of miner's inches equal to the discharge of 1 cubic foot per second.

Thus $1 \div 0.02 = 50$ statutory miner's inches; that is, 50 statutory miner's inches are equal to 1 cubic foot flow per second.

North Bloomfield, &c., miner's inch.—At the North Bloomfield, Milton, Columbia Hill, and Gold Run hydraulic mines the water is measured under a 7-inch pressure. The value of the North Bloomfield, &c., miner's inch, as found by the carefully conducted experiments of Hamilton Smith, jr., C. E., is equal to 2,230 cubic feet flow in twenty-four hours. Whence 38.74 miner's inches under a 7-inch pressure are equal to 1 cubic foot flow per second.

Basis of computation.—With respect to other valuable experiments coming to the knowledge of the writer, some have given higher and

some lower results than the foregoing. A careful comparison of all the facts before me warrants the adoption of the proposition, as a basis of computation of a table for practical use, that 2,230 cubic feet of water under a 7-inch pressure will flow through each square inch of the discharge opening in twenty four hours. Table 1 has been computed on this basis.

APPLICATION OF TABLE 1.

(1) The Smartsville miner's inch is measured under a 9-inch pressure, as shown by Aug. J. Bowie, jr., M. E., in a publication entitled "Bowie on Measurement and Flow of Water;" the Smartsville 24-hour miner's inch is equal to 2,534.4 cubic feet.

By Table 1 it is seen that the 24-hour miners' inch, under a 9-inch head is 2,528 cubic feet. The difference, $2,534.4 - 2,528 = 6.4$ cubic feet, being but one-fourth of 1 per cent. of the tabulated flow, is too small to be noted in practice.

(2) By Table 1 it is seen that "under a 4-inch pressure (statutory) 51.13 miner's inches are equal to 1 cubic foot flow per second." In practice, 50, on account of its close approximation and greater convenience, is usually employed. Thus, a person having a "water-right claim" of any number of miner's inches, say 4,000, and desiring to ascertain their equivalent in cubic feet, would, in practice, divide their number by 50 = $4,000 \div 50 = 80$ cubic feet, instead of dividing by the tabulated number 51.13; $4,000 \div 51.13 = 78.23$ cubic feet. The difference in this case is $80 - 78.23 = 1.77$ cubic feet, or $2\frac{1}{4}$ per cent. of the lesser amount.

(3) To determine the quantity of flow, the head opening and time being given.

In Table 1, find opposite the given head in that column whose heading answers to required denomination, as "minute inch," hour inch," "24-hour inch," the value of 1 inch flow. Multiply the value so found by the given area of the opening in square inches, and the specified time in minutes, hours, or twenty-four hours, according to the requirements of the case. Thus, the head being 7 inches, the opening 100 square inches, and the time 11 hours, to determine the flow: Opposite the given head, 7 inches, in the "hour-inch" column, will be found 92.92 cubic feet. Then, $-92.92 \times 100 \times 11 = 102,212$ cubic feet sought.

(4) To determine how many miner's inches under one head are contained in a miner's inch under another head:

Divide the number of cubic feet flow per second due the latter head by the number of cubic feet flow due the former. Let, for example, the respective heads be 4 inches and 7 inches.

Table 1 shows that .0195 cubic feet flow per second is due a 4-inch head, and .0258 cubic feet flow per second is due a 7-inch head. Then, $.0258 \div .0195 = 1.323$ miner's inches (statutory). In other words, 1.323 times as much water will flow under a 7-inch head as will flow under a 4-inch head.

In a similar manner can the relative values of flow under different heads, one in units of the other, be determined.

The variety of values comprised in the term miner's inch in different districts of California is often a source of no little annoyance and confusion.

A uniform standard of measurement is much required. A cubic foot would obviously be the most simple unit to adopt. If, for convenience, the miner's inch is still to be used, let it in all parts of the State have a fixed value in denomination of cubic feet.

RECTANGULAR WEIRS.

A rectangular weir is a vertical, open orifice, through which the flow of water is measured in its passage from a reservoir or other storing place, or in its passage over a submerged dam across a flume, canal, or natural stream. A weir should be free from vibration. Its crest and ends should be chamfered, on the down-stream side, to an edge, say, one-tenth of an inch thick. Its up-stream face should be vertical, and its down-stream face so inclined or fashioned as not to resist the flow.

On the up-stream side the depth of water below the level of the crest should be fully twice as great as the head of water on the crest.

The head is the vertical distance between the level of the crest and the level of still water at a point a short distance above the weir. In ordinary practice the head is measured with a rule from the top of a post set level with the crest. If greater accuracy be required the "Boyden hook-gauge" should be employed. Care must be taken that the flow over the weir shall not be affected by the approaching stream. The area of the weir opening should not exceed a fifth part of that of the supply stream.

With proper care in taking the field data the weir affords very accurate means of measuring the flow of water. This, in connection with its simplicity, cheapness, and wide application, renders it of great practical importance, especially to those concerned in the measurement of flowing water in places of difficult access. Thus a temporary dam built across a natural stream with a crest-board firmly fitted level and vertically widthwise to the dam's top makes a good measuring weir.

In flumes and canals measuring weirs can obviously be constructed with equal facility.

Table 2 has been computed for the flow of water over each foot in length of a rectangular weir regardless of loss by friction at the ends.

APPLICATION OF TABLE 2.

(1) To compensate the loss by friction at the ends of the weir deduct two-tenths the head of water in feet from the length of the crest between the ends.

Thus, the length of weir being 3 feet and the head 6 inches, to determine the flow per second in cubic feet:

$$6 \text{ inches head} = .5 \text{ foot}; \; .5 \times .2 = .1 \text{ foot loss.}$$

Whence $3 - .1 = 2.9$ feet, corrected length of weir.

By Table 2 the "flow over 1 foot length" for a 6-inch head is 1.1771 cubic feet per second. Then, $1.1771 \times 2.9 = 3.41$ cubic feet sought.

(2) The length of weir being 10 feet, the head 4.5 inches, let it be required to determine the cubic feet flow in twenty-four hours; also the equivalent flow in "24-hour miner's inches," under a 4-inch head. Now, $4.5 \div 12 = .375$ feet; $.375 \times .2 = .075$ feet loss; $10 - .075 = 9.925$ feet, corrected length of weir.

By Table 2, in "head from still water" column find 4.5 inches, opposite which in "flow per second over 1 foot length" column will be found .7435 cubic feet. Then, $.7435 \times 9.925 = 7.379$ cubic feet per second; 24 hours = 86,400 seconds. Whence $7.379 \times 86{,}400 = 637{,}566$ cubic feet flow in 24 hours. By Table 1 a "24-hour inch" under 4-inch head is 1,690 cubic feet. Then $637{,}566 \div 1{,}690 = 377$ "24-hour miner's inches" sought.

WATER PIPES.

The quantity of water which will flow through a pipe depends upon its head and upon the diameter and length of the pipe.

The head is the vertical distance between the levels of the water's surface in the reservoir and the center of the outlet end of the pipe. A portion of this head is expended in overcoming the resistances of entry and in generating the velocity of discharge; the remainder of the head is expended in overcoming the resistances within the pipe. This remaining head is termed the fall, dividing which by the length of the pipe in miles gives the fall per mile.

In pipes several miles long the entry and velocity head can be omitted, in practice, without material error. A water pipe, from its inlet end, should be funnel form, or conic, for a distance equal to three times its diameter. The diameter of its inlet end should be fully 20 per cent. larger than the diameter of the main portion of the pipe. The "bell mouth" is recommended as the best form for the inlet end.

Table 3 has been computed for the carrying capacities of pipes whose lengths are not less than a thousand times their respective diameters.

The computations have been made for those sizes most in use. Those of 9, 11, 15, and 22 inches diameters are termed at the pipe manufactories "running sizes."

APPLICATION OF TABLE 3.

(1) Let it be required to find the flow of water per second in a pipe 22 inches diameter, having 26.40 feet fall per mile; also to find its equivalent flow in statutory miner's inches, or inches measured under a 4-inch pressure.

In "fall per mile" column, Table 3, find the given head 26.40, opposite which in "diameters 22-inch" column will be found 14.78 cubic feet, the quantity sought.

In Table 1, "head on center" column, find 4 inches, opposite which in "miner's inches" column will be found 51.13. Then, $14.78 \times 51.13 = 755.7$ statutory miner's inches. Or, as in common practice, $14.78 \times 50 = 739$ statutory miner's inches.

(2) Required the requisite "fall per mile" for a 22-inch pipe to carry 500 statutory miner's inches.

In "diameters, 22 inches" column, Table 3, find that number, which multiplied by 50 will make 500, or nearest approximate thereto. 10.01 cubic feet is seen to be the nearest approximate, opposite which in "fall per mile" column will be found 12.67 feet, the head or fall sought.

(3) Having 10 feet fall per mile, let it be required to determine the diameter of a pipe that will carry 20 cubic feet of water per second, or its equivalent, 1,000 statutory miner's inches.

In "fall per mile" column, Table 3, find 10.03 feet nearest approximate to the given fall 10 feet, opposite which find 20.32 cubic feet, nearest approximate to the given quantity 20 cubic feet. This is found in "diameters, 30 inches" column; hence, 30 inches is the diameter sought.

AUXILIARIES TO TABLE 3.

Entry and velocity head.—The entry and velocity head is constant for the same velocity, regardless of the fall and length of pipe. In Table A are given certain velocities, and their corresponding entry and velocity heads underneath them.

Velocity in pipes.—The velocity in a pipe is found by dividing the quantity of flow per second by the area of the cross-section of the pipe; or more readily by the use of Table B, in which are arranged in the upper line the diameters of pipes and in the lower line a corresponding multiplier for each pipe, which being multiplied into the pipe's flow will give the approximate velocity.

APPLICATION OF TABLES A AND B.

In Table 3 it is seen that in a 22-inch pipe the flow corresponding to a fall of 52.8 feet per mile is 21.06 cubic feet. Let it be required to find the entry and velocity head and thence the entire head.

By Table B the "multiplier" for a 22-inch pipe to determine the velocity of flow is .379. Then, $21.06 \times .379 = 7.98$ feet velocity per second.

By Table A the nearest approximate velocity to 7.98 feet is seen to be 8 feet, whose "entry and velocity head" is 1.5 feet. Hence,

$$52.8 + 1.5 = 54.3 \text{ feet entire head.}$$

ROUGH AND FOUL WATER PIPES.

Table 3, as its heading shows, is for clear pipes. In case the pipe is rough and foul, multiply the tabulated flow for a clean pipe by .9, .8, .7, &c., as judgment shall dictate. Thus, for a clean pipe, Table 3 shows the flow per second to be, in a 30-inch pipe, having a fall of 11.62 feet per mile, 21.8 cubic feet. Now, if the pipe be slightly rough and foul, the flow will be: $21.8 \times .9 = 19.62$ cubic feet; if very rough and foul, $21.8 \times .7 = 15.26$ cubic feet.

ANGULAR BENDS.

The occurrence of angular bends in a water pipe should be avoided. However, in practice, little heed is paid to a single bend if the deflection does not exceed 4 feet in a distance of 10 feet (4 : 10), and the velocity of flow is not over 6 feet a second, or 4 miles an hour. For a greater deflection an additional head should be allowed. This head depends, as is evident, upon the velocity of flow and the degree or amount of deflection. For the most part in practice the velocity of flow in long pipes does not exceed 6 feet per second.

The velocity being 6 feet per second, the additional head required will be 2 per cent. of the fall for a deflection of 5 feet in a distance of 10 feet (1 : 2), and 10 per cent. for a deflection of 10 feet in a distance of 10 feet (1 : 1). Thus, there being a deflection of 1 : 1 in a pipe, and the head 110 feet, and the velocity 6 feet per second, employ 100 feet as the efficient head.

INVERTED SIPHON.

A pipe for conveying water across a valley or other depression between two elevated points is called an "inverted siphon."

A straight line connecting the point of inlet and the point of outlet, without hindrance, is termed the "hydraulic gradient." In case of an obstruction intervening, then the hydraulic gradient is a straight line connecting the point of inlet and the point of greatest elevation of that obstruction.

Pounds pressure.—The vertical distances in feet between any given point in the pipe and the hydraulic gradient, multiplied by .434 gives the pressure in pounds per square inch at that point.

Thus, if the vertical distance be 887 feet, as in case of the Spring Valley Mining Company's pipe, then will the pressure per square inch be $887 \times .434 = 385$ pounds.

Thickness of pipe.—The required thickness in inches, of the shell of an iron pipe is equal to the product of the pipe's radius in inches and the pressure in pounds per square inch, divided by the working strength per square inch of the iron.

Working strength.—The working strength varies with the quality of the iron. The pipe at the hydraulic works of the Spring Valley Company, Butte County, California, laid in 1870, now in perfect condition, as reported by the engineer in charge, is three-eighths of an inch thick, and is subjected to a working strain of 17,549 pounds per square inch. This seems rather high for ordinary plate iron.

Assuming the diameter of a water pipe 36 inches, the pressure per square inch 385 pounds per square inch (due, as found, 887 feet head), and the working strength of the iron 17,549 pounds per square inch, then will the requisite thickness of shell be—

$$385 \times 18 \div 17{,}549 = .395 \text{ inch.}$$

FLUMES, CANALS OR DITCHES, AND NATURAL STREAMS.

These aqueducts are open channels of various forms. Of those having vertical sides and wet perimeters (sum of width and wet sides) equal each to each, that whose width is twice its depth has the greatest carrying capacity. In computing Table 4 this form has been adopted.

APPLICATION OF TABLE 4.

Let it be required to determine the quantity of water which will flow in a rectangular flume 4 feet wide and 2 feet deep, the fall per mile being 6 feet.

In "fall per mile" column, find the given fall 6 feet, opposite which in "W. 4, D. 2" column will be found 12.54 cubic feet, which is the quantity sought.

FLOW OF WATER IN CANALS OR DITCHES HAVING SLOPE SIDES.

The depth of water being constant, it is evident, if in a rectangular flume, the top width be increased and the bottom width be equally diminished, that the area of the resulting canal with slope sides will be equal to the area of the rectangular flume. In practice, the slope of a canal's sides is made to vary according to the firmness of the ground or other conditions imposed.

Let the amount of slope be expressed by the relation of its vertical depth to its base, as 4 on 1, 4 on 2, or 2 on 1, &c.

Table C has been computed for the determination of the flow of water in canals or ditches of different forms. It will be borne in mind that the depth of water and sectional area of the canal whose carrying capacity is sought, are to be respectively equal to those of the rectangular flume employed as the basis of calculation.

An inspection of Table C, shows that under these conditions the canal having the greatest carrying capacity is such that its slope is 4 on 2.31; also that its carrying capacity is equal to that of the rectangular flume when its slope 3 on 4.

The canal having three plane sides of the greatest carrying capacity is semi-hexagonal. Its advantage, however, over that whose slope is 4 on 2.31 is only one-half of 1 per cent.

APPLICATION OF TABLE C.

The fall being 5 feet per mile, the depth of water 2 feet, required the flow of water in a canal whose side slopes are 2 on 1.

In "fall per mile" column find 5 feet, opposite in "W. 4, D. 2" column (2 feet being given depth) will be found 11.44 cubic feet.

Find in Table C the given slope "2 on 1," opposite which will be found the multiplier 1.035. Then, $11.44 \times 1.035 = 11.84$ cubic feet, quantity sought.

FLOW OF WATER IN WIDE FLUMES.

Omitting the consideration of friction on resistance at the sides in the several flumes embraced in Table 4, let the flow of water for a foot in width in each flume be computed and tabulated. Thence the flow for any width can be determined by multiplying the number of feet contained in that width by the tabulated flow. This width should be such that being added to the width of the flume of the same depth in Table 4 the sum will be equal to the given width of the flume whose flow is sought.

APPLICATION OF TABLES D AND 4.

The fall being 1 foot per mile, let it be required to determine the flow of water in a flume 2.5 feet deep and 25 feet wide.

The given depth being 2.5 feet, the corresponding width by Table 4 is 5 feet. Then, $25-5=20$ feet width free of end friction. By Table 4, the flow for 1 foot "fall per mile" in a flume, "W. 5, D. 2.5," is 9.57 cubic feet per second. By Table D, the multiplier for a depth of 2.5 feet is .348. Then—

$9.57 \times .348 = 3.33$ cubic feet flow per foot width, with no end friction.

$20 \times 3.33 = 66.6$ cubic feet flow. no end friction.

5 (as found) 9.57 cubic feet flow, involving end friction.

25 feet $= 76.17$ cubic feet entire flow.

FLOW OF WATER IN WIDE CANALS OR DITCHES.

The difference between the carrying capacities of wide rectangular flumes and canals of sloping sides, within the limits of slope considered in Table C, is so small that in practice the measure of flow of one may be taken for that of the other, having an equal depth and equal area of cross-section. Thus: if in the last example we substitute for the rectangular form that of a canal with side slopes of 1 on 2, the top width will be 30 feet and the bottom width 20 feet. The "multiplier" for this slope by Table C is .946. Then $9.57 \times .946 = 9.05$ cubic feet; $9.57 - 9.05 = .52$ cubic feet; $76.17 - .52 = 75.65$; $.52 \div 76.17 = .007$ nearly. That is, the loss by change of form in this case is only seven-tenths of 1 per cent.

Rough and foul flumes, canals or ditches.—As in the case of pipes, if a flume, canal, or ditch is rough and foul, employ a multiplier, as .9, .8, or .7, in connection with the use of Table 4, as judgment shall dictate with respect to the degree of that roughness and foulness.

FLOW OF WATER IN NATURAL STREAMS.

The flow of water in a natural stream can be measured, as hereinbefore shown, by means of a weir; also in the same manner as that em-

ployed in the measurement of the flow in flumes and canals just described. Indeed, it matters not whether the banks of the stream are natural or artificial; the principles involved in its measurement are the same. In each case the factors of quantity of flow are the area of cross-section and mean velocity.

The area of cross-section is the product of the width and mean depth.

To find the mean depth, measure in a straight line across the stream at equal distances apart the several depths of water. Add together the half sum of the depths at the banks and the sum of the intermediate depths. Divide this amount by the number of equal parts taken in the width of the stream. The result will be the mean depth.

Rough approximate.—The area of cross-section of stream beds of usual rounded form is often assumed to be equal to two-thirds the product of the surface width and central depth.

Mean velocity.—For finding the mean velocity of a stream of water, various devices, as "tight tin tubes," each loaded at one end so as to float vertical in still water, and as nearly so in streams as the current will permit, "pilot's tube," "patent logs," &c., are employed.

Wooden floats, of nearly the specific gravity of water, are, however, mostly used in common practice. By these the surface velocity is taken; thence the mean velocity is determined by calculation based on well authenticated experimental data.

Having chosen a straight section of a stream free as possible to be found from eddies, roughness, and foulness of bottom, and having divided the stream into sections parallel with its course, cast into it wooden floats. Note the time taken by a float in each section to pass through a given distance, as 100 feet, and thence determine the surface sectional velocity per second. Divide the sum of the several velocities of the floats by their number; the result will be the mean surface velocity of the stream per second; whence the mean velocity for the mean depth of the entire cross-section can be calculated as above stated.

CENTRAL SURFACE VELOCITY AND CORRESPONDING MEAN VELOCITY.

The simplest plan of finding the approximate mean velocity is by means of the central surface velocity; in other words, by means of the greatest surface velocity.

Having made several trials with floats as above described, let the greatest velocity well established by any one of them be taken as the central surface velocity.

For the central surface velocities, from five-tenths of a foot to 6 feet, the corresponding mean velocities have, by the aid of experimental data, been computed and the results arranged in Table 5.

APPLICATION OF TABLE 5.

Let it be required to determine the flow of water in a stream in which the cross-section is 50 square feet, and the central surface velocity 3 feet.

In "central surface velocity" column, Table 5, find the given velocity 3 feet, opposite which, in "mean velocity" column will be found 2.424 feet. Then, $2.424 \times 50 = 121.2$ cubic feet flow per second.

Rough approximate.—A rough approximate is readily found by taking one-half the product of the surface width, central depth, and central velocity of a stream.

Thus, if the surface width of a stream be 25 feet, the central depth 4 feet, and the central surface velocity 1.5 feet, then will the flow be $25 \times 4 \times 1.5 \div 2 = 75$ cubic feet flow per second, or $75 \times 50 = 3{,}750$ statutory miner's inches.

FLOW OF WATER THROUGH NOZZLES—APPLICATION OF TABLE 6.

(1) Let the quantity of water which a 6-inch nozzle, under a 200-foot head, will discharge per second be required.

In "head" column, Table 6, find 200 feet, opposite which, in "diameters of nozzles in inches, 6" column, will be found 20.64 cubic feet, the quantity sought.

(2.) The entire fall between the inlet end of a pipe 36 inches diameter, 4 miles long, and the outlet end, at a hydraulic mine, being 284 feet, and the quantity of water being 1,500 statutory miner's inches, let it be required to find the efficient head and the diameter of the requisite nozzle.

Divide the given number statutory miner's inches by 50. Thus, $1{,}500 \div 50 = 30$ cubic feet.

In "diameters, 36 inches" column, Table 3, find 30 cubic feet, or nearest approximate to it, 30.29 cubic feet, opposite which, in "fall per mile" column, will be found 8.45 feet, the loss of head per mile. Then, $8.45 \times 4 = 33.8$ feet loss for the 4 miles' length, $284 - 33.8 = 250.2$ feet efficient head sought.

In "head" column, Table 6, find 250, opposite which the nearest approximate number to 30 (equivalent to 1,500 miner's inches) is 31.54 cubic feet in "diameter of nozzles in inches, 7" column. Then, 7 inches is the diameter of the nozzle sought.

QUANTITY OF WATER REQUIRED FOR VARIOUS MINING PURPOSES.

Hydraulic mining.—Hydraulic mining, in a comprehensive sense of the term, comprises all classes of mining in which the metallic substance sought is separated from its earthy mass or matrix by means of water. But the term as employed in California is, for the most part, restricted to that class of mining in which a stream of water is projected under great pressure from a nozzle against a deep gravel deposit or earthy formation for the purposes of disintegrating the mass, thence freeing the gold and carrying off the *débris*.

The relation of the quantity of water employed to that of material removed varies in different mines and in different parts of the same mine.

Duty of an inch of water.—This phrase involves in its meaning the work of disintegration; but as the projecting head is variable from 50 to 350 feet and upward, the phrase seems to refer chiefly to that portion of the work performed by the water in carrying off the *débris* in a sluice, the grade of which is usually 6 inches per 12 feet.

Experience shows that the duty of a 24-hour miner's inch, under a 7-inch head equivalent, as shown by Table 1, to 2,230 cubic feet flow in twenty-four hours is in the lower portions of certain mines as follows:

	Cubic yards.
North Bloomfield mine	3.5
Milton mine	2.4
Excelsior mine	2
Gold Run mine	3.5

In the upper portions of the same mines the duty of the miner's inch was much greater, say 5 to 10 cubic yards. Thus, at the Gold Run

mine for six years, to November 1, 1881, 4,389,791 cubic yards were worked with 1,124,367 miner's inches of water, whence the duty per inch was 3.9 cubic yards.

In the State engineer's report to the legislature of the State of California, 1880, the estimated inch duty, is as follows, viz:

	Cubic yards.
Yuba River mines	3.5
Bear River mines	3.0
American River mine	4.5

Lieut. A. H. Payson, in report of California, G. H. Mendell, transmitted to Congress February 1, 1881, estimates the duty of miner's inch at 2.5 yards in large hydraulic mines south of the American River.

One instance is brought to the attention of the writer showing the inch duty to have been 19 cubic yards.

Drift mining.—Drift mining consists in excavating the lower material of a gravel mine by hand, raising it through a shaft to the surface, or conveying it by wheelbarrows and cars through a tunnel to a dump, whence it is either shoveled or piped, as in hydraulic mining, into a sluice to be freed of its gold, and thereupon carried off as *débris*.

As the larger cobble, bowlders, and barren blocks of rock are usually left in a drift mine, and the material broken smaller than in hydraulic mining, a correspondingly less quantity of water is required for working a cubic yard.

The duty of a 24-hour inch (2,230 cubic feet) in this class of mining varies according to the character of the gravel, whether hard and cemented, clayey or sandy, from 3 to 20 cubic yards.

Quartz mining.—The contents of 1 ton of quartz, in its normal condition in the lode, is estimated at 13 cubic feet, and at 20 cubic feet when the quartz is broken as it usually comes from the mine. Adopting the lode measurement it is seen that a cubic yard of quartz is $27 \div 13 = 2.08$ tons, nearly.

Experience shows that the duty of a miner's inch is as follows:

Duty of miner's inch (under 4-inch pressure) in the reduction and amalgamation of silver ores in a "stamp silver mill," Nevada, 3.25 cubic yards, or 6.76 tons; in the reduction and amalgamation by riffles on copper plate in "stamp gold mill," California, 5.78 cubic yards, or 12 tons.

Duty of miner's inch (under 7-inch pressure) in the former case (silver), 4.3 cubic yards, or 8.93 tons; in the latter case (gold), 6.65 cubic yards, or 15.88 tons.

The volume of water to that of ore is, in working silver ores, Nevada, 19.5 to 1; in working gold ores, California, 11.1 to 1; in working copper ores, Lake Superior, 20 to 1.

QUANTITY OF WATER REQUIRED FOR PURPOSES OF IRRIGATION.

As the area of land is usually expressed in denomination of acres, a convenient unit of measure for irrigating purposes is that quantity of water which will cover 1 acre 1 inch deep. This quantity is 3,630 cubic feet, equivalent to 2.1 24-hour miner's inch, measured under a 4-inch pressure.

The total depth of irrigation, as practiced in California, varies for different soils and products, from 2 to 5 feet.

(1) If one of the partial irrigations be assumed 5 inches deep, then 1 acre will require $2.1 \times 5 = 10.5$ 24-hour miner's inches. And 1,000 acres

will require $10.5 \times 1{,}000 = 10{,}500$ 24-hour miner's inches, or $10{,}500 \div 50 = 210$ cubic feet flow per second for twenty-four hours. A cubic foot flow per second will irrigate 1 acre an inch deep per hour, nearly.

(2) Table 4 shows that a flume "10 W., 5 D." (10 feet wide, 5 feet deep), having "1 foot fall per mile," will discharge 66.54 cubic feet of water per second. Then, on the data immediately preceding, it will irrigate $66.54 \times 24 = 1{,}597$ acres one inch deep in twenty-four hours.

(3) Let it be required to determine the number of acres which can be irrigated 42 inches in depth in eighty-four days by a canal whose depth is 4 feet and mean width 8 feet, slope of banks 3 on 4, and fall per mile 2 feet, allowing 25 per cent. for loss by absorption, evaporation, &c.

By Table C it is seen that the multiplier for a canal whose slope of banks is 3 on 4 is 1; that is, its carrying capacity is equal to that of a rectangular flume of equal width and depth.

In "fall per mile" column, Table 4, find 2 feet, the given fall, opposite which, in "W. 8, D. 4" column, will be found 50.36 cubic feet flow per second. Then, $1.00 - 25 = .75$ efficient irrigating percentage, $50.36 \times 24 \times 84 \times .75 \div 42 = 1{,}813$ acres, approximately.

MEASUREMENT OF THE POWER OF WATER AS A MOTOR.

The unit in the measurement of power is a *foot-pound;* that is, the amount of energy necessary to raise 1 pound weight vertically through a distance of 1 foot. On the other hand, 1 pound falling by the force of gravity through a distance of 1 foot, generates a *foot-pound.*

(1) Then, 100 pounds falling vertically 50 feet will produce $100 \times 50 = 5{,}000$ "foot-pounds."

A "horse-power" is 550 foot pounds tendered in one second.

The weight of a cubic foot of fresh water is estimated in practice at 62.5 pounds.

(2) Let it be required to determine the number of "horse-power" which 20 cubic feet of water falling vertically 110 feet will generate; $20 \times 62.5 \times 110 \div 550 = 250$ horse power sought.

(3) The entire head between the levels of the inlet and outlet ends of a pipe 22 inches diameter, 3 miles long, and carrying 810 statutory miner's inches, is 400 feet; let it be required to determine the horse-power which will transmit and the diameter of a nozzle suitable.

$$810 \div 50 = 16.20 \text{ cubic feet flow per second.}$$

In "diameters, 22 inch" column, Table 3, find 16.20 cubic feet, opposite which, in "fall per mile" column, will be found 31.68 feet. Then, $31.68 \times 3 = 95.04$ feet, loss of head by resistances in pipe.

$$400 - 95.04 = 304.96 \text{ feet effective head.}$$

$$16.20 \times 62.5 \times 304.96 \div 550 = 561.4 \text{ horse-power sought.}$$

In "head" column, Table 6, find nearest approximate head to 304.96 feet, viz, 300 feet, opposite which find the nearest approximate flow to 16.20 cubic feet. This is seen to be 17.62 cubic feet in column "diameters in inches 5."

Hence the diameter of the suitable nozzle is 5 inches; by calculation 4.8 inches.

The horse power thus found, to wit, 561.4, is to be multiplied by the efficiency of the wheel or other machine to which the water is applied as a motor.

The efficiency of water-wheels, as found by experience, varies fr 50 to 90 per cent. (.50 to .90).

TABLE 1.—*Flow of water through vertical rectangular openings.*

Head on center.	Flow per second through 1 square inch opening.	Minute inch flow.	Hour inch flow.	24-hour inch flow.	1 cubic foot flow per second.
Inches.	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Miner's inches.*
3	.0169	1.014	60.84	1,460	59.18
4	.0195	1.173	70.42	1,690	51.13
5	.0218	1.309	78.54	1,885	45.86
6	.0239	1.434	86.00	2,064	41.85
7	.0258	1.548	92.92	2,230	38.74
8	.0276	1.655	99.33	2,384	36.24
9	.0293	1.755	105.33	2,528	34.17
10	.0308	1.851	111.04	2,665	32.42
11	.0323	1.941	116.46	2,795	30.91
12	.0338	2.028	121.67	2,920	29.59

TABLE 2.—*Flow of water over weirs.*

Head from still water.	Flow per second over 1 foot length.	Head from still water.	Flow per second over 1 foot length.	Head from still water.	Flow per second over 1 foot length.
Inches.	*Cubic feet.*	*Inches.*	*Cubic feet.*	*Inches.*	*Cubic feet.*
1.00	.0785	4.00	.6380	7.0	1.4868
1.25	.1101	4.25	.6985	7.5	1.6488
1.50	.1448	4.50	.7435	8.0	1.8158
1.75	.1825	4.75	.8253	8.5	1.9951
2.00	.2285	5.00	.8913	9.0	2.1682
2.25	.2672	5.25	.9634	9.5	2.3511
2.50	.3129	5.50	1.0329	10	2.5394
2.75	.3622	5.75	1.1043	12	3.3390
3.00	.4234	6.00	1.1771	14	4.2087
3.25	.4654	6.25	1.2513	16	5.1407
3.50	.5210	6.50	1.3271	18	6.1341
3.75	.5725	6.75	1.4043	24	9.4800

TABLE 3.—*Flow of water per second in clean iron pipes.*

Fall per mile.	6-inch diameter.	9-inch diameter.	11-inch diameter.	15-inch diameter.	22-inch diameter.	30-inch diameter.	36-inch diameter.	44-inch diameter.
Feet.	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*	*Cubic feet.*
1.58	.....	.....	.....	.....	.....	7.78	12.70	22.22
2.11	.....	.....	.....	.....	.....	8.99	14.56	25.55
2.64	.....	.....	.....	.....	.....	10.24	16.85	28.87
3.17	.....	.....	.....	.....	4.61	10.97	18.02	31.46
3.70	.....	.....	.....	.....	5.25	11.90	19.76	34.47
4.22	.....	.....	.....	2.05	5.62	12.84	20.85	37.05
4.75	.....	.....	.....	2.19	6.01	13.48	22.30	39.01
5.28	.....	.....	.....	2.30	6.32	14.21	23.47	41.06
5.81	.....	.....	.....	2.43	6.62	15.05	24.91	42.09
6.34	.....	.....	1.12	2.54	6.94	15.81	26.12	44.97
6.86	.....	.....	1.17	2.65	7.24	16.47	27.29	46.77
7.39	.....	.....	1.22	2.75	7.51	17.81	28.24	48.83
7.92	.....	.....	1.27	2.84	7.78	17.94	29.19	50.62
8.45	.....	.779	1.32	2.94	8.05	18.58	30.29	52.46
8.98	.....	.803	1.36	3.08	8.36	19.21	31.42	54.04
9.50	.....	.827	1.40	3.11	8.55	19.66	32.48	55.48
10.03	.....	.851	1.45	3.21	8.85	20.32	33.40	57.01
10.56	.298	.875	1.49	3.29	9.07	20.79	34.49	58.85
11.62	.314	.907	1.58	3.47	9.55	21.80	36.15	61.71
12.67	.330	.960	1.65	3.63	10.01	22.83	37.74	64.35
13.73	.346	1.00	1.72	3.79	10.48	23.93	39.40	66.87
14.78	.359	1.04	1.79	3.95	10.91	24.86	40.86	69.57
15.84	.377	1.09	1.85	4.11	11.29	25.87	42.88	72.32
18.48	.395	1.17	2.00	4.46	12.25	27.96	45.95	77.95
21.12	.444	1.27	2.14	4.78	13.12	29.84	48.83	83.60
26.40	.496	1.42	2.49	5.37	14.78	33.55	54.89	93.37
31.68	.548	1.56	2.64	5.91	16.20	36.79	59.95	103.28
36.96	.589	1.69	2.86	6.46	17.53	39.66	65.17	111.74
42.24	.631	1.81	3.06	6.90	18.78	42.39	69.80	119.93
47.57	.672	1.92	3.23	7.31	19.93	45.23	74.33	128.26
52.80	.721	2.03	3.42	7.70	21.06	47.71	78.46	.....
63.36	.784	2.24	3.76	8.31	23.07	52.91	82.84	.....
73.92	.858	2.43	4.02	9.15	24.68	57.65	.....	.....
84.48	.922	2.61	4.39	9.81	26.97	.....	.....	.....
95.04	.975	2.77	4.68	10.47	29.70	.....	.....	.....
105.60	1.02	2.93	5.25	11.09	31.15	.....	.....	.....
158.40	1.26	3.63	6.09	13.66	.....	.....	.....	.....
211.20	1.48	4.22	7.02	15.84	.....	.....	.....	.....
264.00	1.67	4.76	8.24	.....	.....	.....	.....	.....
316.80	1.93	5.24	.....	.....	.....	.....	.....	.....
369.60	1.98	5.69	.....	.....	.....	.....	.....	.....

TABLE A.—*Auxiliary to Table* 3.

Velocity in feet	2.4	3.3	3.8	4.7	5.6	6.6	7.3	8.0	11.4
End and v. head in feet	.13	.25	.34	.50	.75	1.0	1.25	1.5	3.0

TABLE B.—*Auxiliary to Table* 3.

Diameters in inches	6	9	11	15	22	30	36	44
Multipliers	5.093	2.263	1.515	.815	.379	.204	.142	.095

TABLE 4.—*Flow of water per second in rectangular flumes.*

Fall per mile.	*W., 1.5, D., .75.	W., 2, D., 1.	W., 2.5, D., 1.25.	W., 3, D., 1.5.	W., 4, D., 2.	W., 5, D., 2.5.	W., 6, D., 3.	W., 8, D., 4.	W., 10, D., 5.
Feet.	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*
1	.351	.77	1.43	2.32	5.12	9.57	19.49	35.61	66.54
2	.497	1.09	2.03	3.29	7.24	13.54	27.56	50.36	94.15
3	.608	1.34	2.48	4.03	8.87	16.58	33.76	61.76	115.31
4	.702	1.55	2.86	4.65	10.23	19.14	38.99	71.21	133.15
5	.785	1.73	3.20	5.20	11.44	21.41	43.59	79.62	148.86
6	.860	1.89	3.51	5.70	12.54	23.44	47.75	87.21	163.07
7	.929	2.04	3.71	6.15	13.54	25.32	51.58	94.20	176.14
8	.993	2.18	4.05	6.58	14.47	27.07	55.14	100.71	188.30
9	1.053	2.32	4.30	6.98	15.35	28.72	58.48	106.81	199.72
10	1.110	2.45	4.53	7.36	16.19	30.27	61.64	112.59	210.52
11	1.165	2.56	4.75	7.71	16.98	31.75	64.65	118.09	220.80
12	1.216	2.68	4.96	8.06	17.73	33.16	67.52	123.34	230.62

* W. and D. respectively represent width and depth in feet.

TABLE C.—*Auxiliary to Table 4 in finding the flow of water in canals or ditches of var forms.*

Slope.	Multiplier.	Slope.	Multiplier.
4 on 1	1.024	1 on 1	1.022
4 on 2	1.025	3 on 4	1.009
4 on 3	1.009	2 on 3	.987
4 on 3 [illegible]	1.003	1 on 2	.946

TABLE D.—*Auxiliary to Table 4 in finding the flow of water in flumes, each of any g width.*

Depth in feet.	Multiplier.	Depth in feet.	Multiplier.
.75	1.000	2.5	.348
1.00	.835	3.0	.291
1.25	.688	4.0	.220
1.50	.570	5.0	.175
2.00	.435		

TABLE 5.—*Central surface and corresponding mean velocities of streams.*

Central surface velocity in feet.	Mean velocity.	Central surface velocity in feet.	Mean velocity.
.5	.382	3.5	2.852
1.0	.774	4.0	3.284
1.5	1.174	4.5	3.721
2.0	1.584	5.0	4.165
2.5	2.000	5.5	4.609
3.0	2.424	6.0	5.058

TABLE 6.—*Flow of water through nozzles.*

Head.	Diameter of nozzles.						
	2-inch.	3-inch.	4-inch.	5-inch.	6-inch.	7-inch.	8-inch.
Feet.	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*	*Cu. feet.*
50	1.15	2.59	4.60	7.19	10.36	14.10	18.40
100	1.63	3.66	6.52	10.17	14.64	19.94	26.06
150	2.00	4.48	8.00	12.46	17.92	24.42	32.00
200	2.30	5.10	9.20	14.34	20.64	28.20	36.80
250	2.58	5.80	10.32	16.09	23.20	31.54	41.28
300	2.82	6.30	11.28	17.62	25.44	34.54	45.12
350	3.05	6.84	12.20	19.04	27.30	37.32	48.80
400	3.26	7.32	13.04	20.35	29.28	39.89	52.10
450	3.46	7.76	13.84	21.59	31.04	42.31	55.36
500	3.64	8.20	14.56	22.75	32.80	44.00	58.24

THE VARIOUS FORMS IN WHICH GOLD OCCURS IN NATURE.

ILLUSTRATED CHIEFLY BY EXAMPLES FROM THE UNITED STATES.

By WILLIAM P. BLAKE.

HISTORICAL INTRODUCTION.

The object of this article is to present in a popular way an outline
w of the variety of forms as respects bulk, shape, and aggregation,
which the metal gold occurs in nature, and particularly in the gold
ions of the United States. The article is illustrated by figures of
principal crystalline forms which have been observed in this and in
er countries.

Hold as mined is obtained from two very different sources: (1) from
original matrix in veins in rock formations; (2) from placers or the
ıvial deposits of ancient and modern streams.

The two conditions of occurrence are widely different. In the orig-
l matrix gold does not, as in placer deposits, show signs of wearing
ıbrasion. On the contrary, whenever it occurs in visible grains or
ıses, it has sharp angular edges and projections, and if not crystal-
d it penetrates the rock irregularly in various directions, and is so
ıpletely interwoven with and attached to the matrix, usually quartz,
t the metal and the stone cannot be separated without force or
shing, as in stamp mills. But vein gold, as this form of gold is called,
listinction from wash or placer gold, although always angular is not
ays without regularity of form. Under favorable conditions of de-
ition in the matrix the gold assumes its inherent crystalline condi-
. and occurs as a geometrical solid, in crystals, referable to the cubic
isometric system. Crystallizations are, however, extremely rare
pared with the quantity of gold which has been, and is now, annu-
taken from the earth, and crystals of gold are even yet compara-
ly unknown to the majority of miners. Yet there is reason to be-
e that crystals of gold are more numerous than is generally supposed
only in placer gold but in vein gold also.

he various forms in which gold occurs, whether from veins or from
ers, are substantially alike all over the world. The conditions of
in and of its redistribution appear to be similar in all countries, and
relative quantity in the rock and in the gravel deposits appears to
nuch alike in all the great gold regions.

lany of the diverse forms in which gold is found were early recog-
d and were partly enumerated by the early writers on minerals.

liny, who gives an excellent description of placer gold, does not men-
. any peculiar or geometrical form of native gold, from which we
conclude that crystallizations of gold were unknown to him. He
ribes lumps and masses of placer gold, some weighing ten pounds

and more, and says that the best gold is called "*obryzum*," and is thoroughly polished by the rubbing and attrition which it met with by rolling in the beds of streams.

Hill, in his History of Fossils, 1748, says: "Native gold is sometimes found in fine masses of considerable size, many having been found of more than a pound weight; these masses are met with in the gold mines and called are *aurum obryzum* or *obryzium*, but they are very rare; such, however, have been found at times in the German mines." He then describes the placer gold of Guinea and of Scotland as "gold dust," and in a description of gold as it occurs in veins says: "In this stone the gold lies in a very beautiful form and a great variety of figures; some parcels of it are variously divaricated or in form of small branched figures; but these are very rare." Again he mentions coarse gold from the coast of Guinea as lumps of *aurum obryzum* of between 20 and 30 pounds weight. This is an early recognition of the dendritic or branching form, resembling fern leaves, which cyrstalline gold often assumes.

Le Sage, as early as 1777, gave a very good and scientific description of the occurrence of gold. He says that it is found in plates, grains, and in irregular masses, and sometimes crystallized, and describes in succession the octahedral and tetrahedral forms of gold, adding also observations upon capillary and prismatic forms of gold, the latter obtained artificially by expelling the excess of mercury from a gold amalgam.

In Cronstedt's Mineralogy, 1788, four distinct and special forms of occurrence of gold are enumerated: (1) thin superficial or leaved gold; (2) solid or massive, in form of thick pieces; (3) crystallized; (4) with gold, or gold dust.

In regard to the first he adds in the note that native gold in the form of leaves is always crystallized on its surface, and that with a microscope the triangular pyramidal form of these crystals may be seen. And in respect of the crystallized gold he says the form is the octahedral rectangular one for the most part, but there are also cubical crystals. He further cites from Wallerius six different forms of occurrence as follows: (1) solid masses; (2) granular; (3) vegetable, like branches or twigs of plants; (4) drusy, in clusters of small particles; (5) superficial, in thin plates; (6) crystallized.

Daubenton, in his Methodical Tables of Minerals, enumerates eight forms of native gold: (1) powder; (2) grains; (3) spangles; (4) masses or lumps; (5) filaments; (6) branching; (7) lamellar; (8) octahedral crystals.

Buffon, in 1790, writes: "Gold occurs filiform and branching in leaves and sometimes in small grains of octahedral form." He observes that these forms have not been produced by the agency of water, but by the action of fire, regarding them as due to fusion.

Brongniart, in 1807, says that gold occurs in various forms, as octahedral crystals and in trapezoidal dodecahedrons, in filaments, plates, grains, and in pépites or masses free from gangue.

As early as the year 1809 the Government Museum of France (Museum d'Histoire naturelle), under the direction of Haüy, possessed several crystals of gold chiefly from the mines of Transylvania. These mines appear to have furnished most of the earliest known crystallizations of which we have any record. In the descriptions of the specimens by Haüy published in 1809, and republished by Lucas in 1813, we find notice of several crystals from Vöröspatak in Transylvania as follows:

(1) Native gold, "*octaèdre cuneiforme*," in well-defined, sharply-formed

crystals; (2) native gold, trapezoidal, in groups of crystals the size of millet; (3) native gold in elongated octahedrons; (4) native gold in cubo-octahedrons from Matto Grosso, Brazil. Many lamelliform and branching specimens are also described.

These extracts serve to show the progress of knowledge respecting the occurrence of gold, and the diversity of forms in which it had been found up to the beginning of this century. Modern mineralogists cannot be said to have added greatly to this knowledge, but many more complex forms and modifications of crystals have been described and illustrated by figures.

As late as the year 1867, the chief mineralogical collections of Europe, notably those at the British Museum, and at the École des Mines and the Jardin des Plantes, Paris, and the Freiberg Mining Academy, Saxony, were comparatively without fine specimens of good crystals. A great change in the collections has been made since that time, and all these collections have been enriched by specimens from California and Australia.

Amongst the mineralogists who have given special attention to the crystallography of gold, we find the names of Gustav Rose,* Jeremejew,† Kokscharof,‡ Von Leuchtenberg, Naumann, and Von Rath.§ The latter has contributed the results of an exhaustive investigation of the complex forms found in specimens from Transylvania.

CRYSTALLINE GOLD OF AUSTRALIA.

For exact information regarding the gold of Australia, science is indebted especially to Prof. Archibald Liversidge, the Rev. W. B. Clarke, and to Mr. Brough Smyth. The crystalline gold of Australia is usually dodecahedral in form. Professor Booth, of the Philadelphia mint, in a communication to Professor Dana, states that one lot of Australian gold, worth about $4,000, submitted to him in 1853, consisting of grains from the size of a large pea to small sand, was all crystalline and more or less in perfect dodecahedrons.¶ Of the gold of New South Wales, Professor Liversidge says:** "Well-developed crystals are very rare and are never of large size, seldom exceeding one-quarter of an inch in diameter, and the faces are usually more or less cavernous; the most common forms are the octahedron and rhombic dodecahedron. Single and detached crystals are seldom found; they are usually attached end to end, forming strings, wires, and branching or arborescent forms. A beautiful branching tree-like group of large rhombic dodecahedral crystals, weighing some twenty ounces, was formerly to be seen in the Australian Museum collection. * * * Occasionally elongated crystals of rhombic dodecahedra are met with arranged in columnar masses, very similar to groups of basaltic columns."

At Mount Ivor numerous small solid dodecahedrons were obtained retaining portions of the cubic faces, thus forming cubo-octahedrons. A fine series of specimens is now in the British Museum.

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* Poggendorf's Annalen.

† Verhandlungen des K. K. Mineralogischen Gesellschaft zu Saint Petersburg, 1870, Zweite Serie, Bd. V., S. 402.

‡ Materialien zur Mineralogie Russlands, Sechster Band.

§ Krystallisation des Geldes; Zeitschrift für Krystallographie und mineralogie, I, 1877.

¶ Dana's Mineralogy, 1880, p. 8.

** The Minerals of New South Wales, by Archibald Liversidge. Sydney, 1883.

CRYSTALLINE GOLD OF RUSSIA.

The various forms of crystalline gold found in the Urals are enumerated by General Kokscharof, the Imperial Russian mineralogist, in his work on the Minerals of Russia,* as follows:

Form of crystals.	Notation according to Weiss.	According to Naumann.
Octahedron	(a : a : a.)	O
Hexahedron	(a : ∞ a : ∞ a.)	∞ O ∞
Rhombic dodecahedron	(a : a : ∞ a.)	∞ O
Trapezohedron	(a : a : ½ a.)	3 O 3
Tetrahexahedron	(a : ∞ a : ½ a.)	3 O 2
Do	(a : ∞ a : ⅔ a.)	∞ O ½
Hexoctahedron	(a : ½ a : ½ a.)	4 O 2
Do	(a : ma : na.)	m O n

The Prince Maximilianovitch von Leuchtenberg has described a remarkable mass of Siberian gold about three inches long, of which Kokscharof gives a figure of the natural size. It has the appearance of an elongated rhombic dodecahedron, and is deposited in the Museum of the Mining Institute at Saint Petersburg.

VARIOUS CRYSTALLINE FORMS OBSERVED.

Dufrénoy, in his Mineralogy published in 1845, gives a series of beautifully engraved figures of gold crystals, some of which are from the memoir of G. Rose. As these are accompanied by references to the localities of the crystals, and clearly represent the chief crystalline forms of gold, they are here reproduced. The cube, octahedron, and dodecahedron are familiar forms, and the figures may represent gold crystals from various localities in different parts of the world.

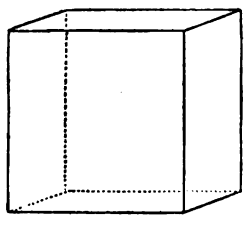


FIG. 1.

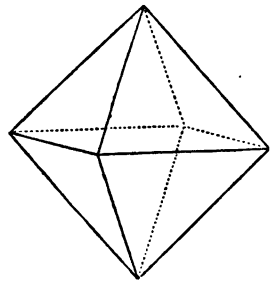


FIG. 2.

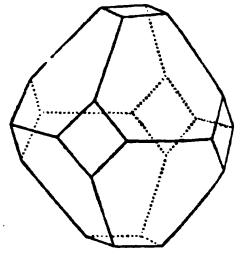


FIG. 3.

The three figures here given, 1, 2, 3, represent, respectively, the cube, the octahedron, and the cubo-octahedron. Gold in simply cubic crystals, without modification of the angles, is very rare, but octahedrons are comparatively numerous.

The octahedron, Fig. 2 is, as will be shown, the characteristic form

* Materialen zur Mineralogie Russlands.

rystals found in California, and the cubo-octahedron, Fig. 3, is racteristic of the Australian gold, as is also the dodecahedron, Fig. 4.

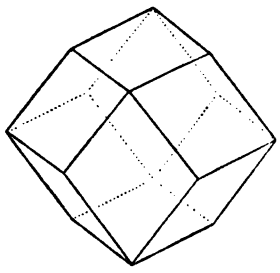


FIG. 4.

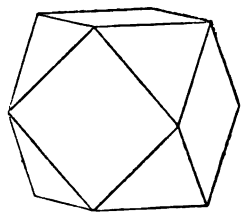


FIG. 5.

ig. 5 represents a cubo-octahedron in which the octahedral planes triangular and subordinate to the planes of the cube.

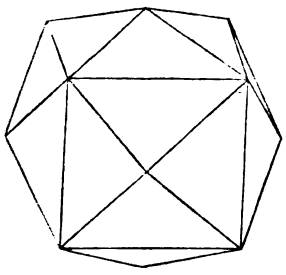


FIG. 6.

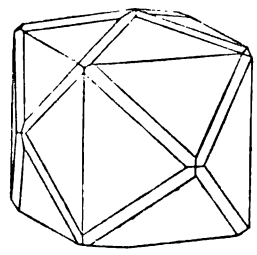


FIG. 7.

he hexatetrahedron, a solid bounded by twenty-four faces, is a form hich gold not infrequently occurs, and is represented by Fig. 6, which y be regarded as a cube with a low pyramid upon each face. It is ietimes called the "four-faced cube." Gold crystallized in this form s been found at Goyas, in Brazil. Fig. 7 represents a hexatetra- ıron, the same as in Fig. 6, but with the pyramidal edges truncated, ning a narrow plane on each edge of the pyramid, which, if extended, ıld give an obtuse trapezohedron. Crystals found in this form in ızil were striated parallel to the diagonals of the cube.

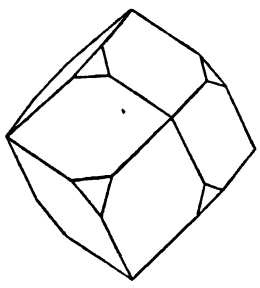


FIG. 8.

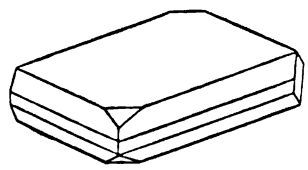


FIG. 9.

nother form of gold crystal found in Siberia is represented by Fig. a dodecahedron, with eight angles truncated, producing the trian-

gular plane of the regular octahedron. Tabular crystals showing the faces of the cube, the octahedron, and the dodecahedron, as shown by Fig. 9, have been found at Matto Grosso, Brazil. Two of the cubic faces are greatly extended, almost to the extinction of the other faces. Such crystals, showing the planes of the cube, the octahedron, and the dodecahedron, were called *triforms* by Haüy.

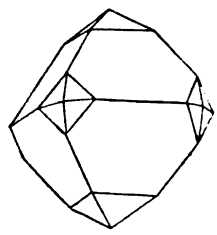


FIG. 10.

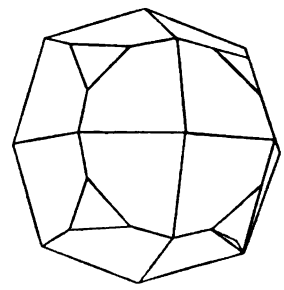


FIG. 11.

Fig. 10 represents an octahedron with each of the solid angles replaced by an obtuse pyramid giving, when extended, a trapezohedron.

Fig. 11 represents a trapezohedron from Brazil, showing also faces of the octahedron. It is essentially the same solid shown in Fig. 10, but with a greater development of the trapezohedral planes.

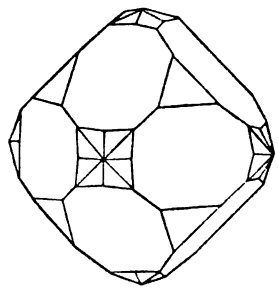


FIG. 12.

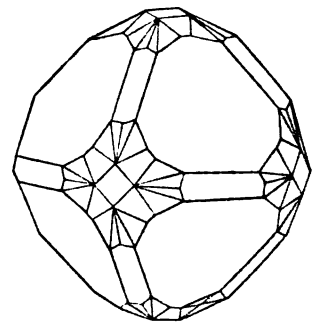


FIG. 13.

Crystals of greater complexity and many planes have been found at Beresof, Siberia, as shown in Figs. 12 and 13. Fig. 12 represents an octahedron with the edges truncated by dodecahedral planes and the solid angles of the dodecahedron replaced by pyramids of eight triangular facets.

Fig. 13 represents an octahedron with remnants of the faces of the cube—a cubo-octahedron—with dodecahedral planes on the edges of the octahedron. The solid angles are replaced not only by the faces of the cube, but by twenty additional facets formed upon the edges at the intersection of the octahedral and the dodecahedral planes with the cube, thus giving a solid bounded by 146 planes. This and the crystal represented by Fig. 12 were described by G. Rose.

Hemitroped crystals, in which one half of the crystal appears to have been turned or revolved upon the other half, are found in gold as well

ı other crystalline minerals. Fig. 14 represents such a crystal Matto Grosso, Brazil. It is an octahedron hemitroped, and flat-

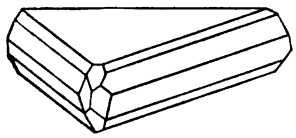


FIG. 14.

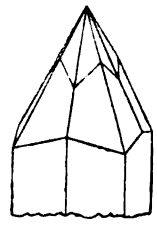


FIG. 15.

l parallel to a face, showing also dodecahedral planes. This spec- is figured by Dufrénoy from the specimen in the collection of the e des Mines, Paris, France.

ɔld also assumes prismatic forms by compounding, giving solids h appear to be referable to another system. An example of this is found in a crystal from Transylvania, figured by Dufrénoy after ævy,* and represented here by Fig. 15. It has eight prismatic es and a pyramid of eight faces. It is supposed to be a macle par- to one of the faces of the octahedron.

GOLD CRYSTALS FROM CALIFORNIA.

ıe of the first American mineralogists to direct attention to the oc- ence of gold crystals in California was the late Mr. Francis Alger, oston, an enthusiastic lover of minerals, and one of the American ors of the edition of Phillips's Mineralogy in the United States in . In a contribution to the American Journal of Science he described ctahedral crystal of unusual size from California, and gave a figure ːh has been reproduced in the editions of Dana's Mineralogy.

ıe general habit of the gold crystals of California is octahedral and ɪrescent. Very few crystals have been found in veins. Most of e now in collections were obtained from wash gold, which has not ı so much water-worn as to obliterate the crystalline faces; and ngst the octahedra so found there are few which are even approxi- ːly perfect. They are generally distorted by lengthening or by pression parallel to a face, or they are cavernous and only partly ed. Even the solid octahedra generally have depressed faces, often series of step-like planes, and again by a series of wire-like threads ing a skeleton framework, not quite filled out with gold. This ːture gives the effect of raised edges so characteristic of the Cali- ːa crystals. Perfectly formed crystals with brilliant faces are ex- ely rare. A quartz mine may be worked for a generation before group of crystals may be developed and saved. At the Princeton ɔ on the Fremont estate in Mariposa County, although specimens of ːtz carrying coarse gold were not infrequent at the mine, there is one instance known of finding gold in a crystalline state in the ːtz of this mine.

attenɛd octahedral crystals.—The most common form of distortion ngst the octahedral crystals of California is flattening parallel to of the opposite faces of the octahedron. This flattening is fre-

*Traité de Mineralogie, par A. Dufrénoy, 1847.

quently carried so far as to almost obliterate all the planes of the crystal but two, giving as a result a thin triangular or a six-sided plate, such as are represented in Figs. 16, 17, 18, 19, and 20.

FIG. 16. FIG. 17. FIG. 18. FIG. 19. FIG. 20.

Solid and cavernous octahedrons.—The following figures will illustrate some of the most common forms of crystals of gold taken from the placers:

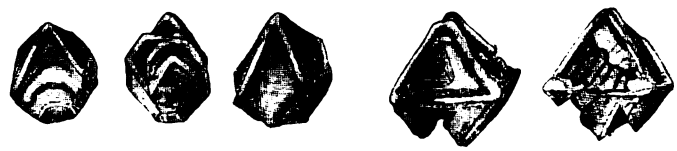


FIG. 21. FIG. 22. FIG. 23. FIG. 24. FIG. 25.

Figs. 21, 22, 23, 24, 25 represent in full size flattened and imperfect octahedrons from the placer deposits at Michigan Bluffs, Placer County, collected for me in the years 1853 and 1854 by Charles T. Blake, esq., of San Francisco. Figs. 24 and 25 represent opposite sides of the same crystal, an octahedron with cavernous faces, from the divide of the American River at or near Forest Hill.

Figs. 26, 27, 28, are three different views of the same crystal, a solid octahedron elongated at one side, probably at the point of attachment to the gangue or vein-stone. The precise locality of this octahedron is not known, but it is from one of the middle gold counties.

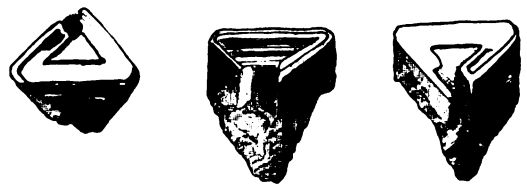


FIG. 26. FIG. 27. FIG. 28.

This crystal weighs 210 grains and appears to contain a large amount of silver, as the color is light pale yellow.

FIG. 29. FIG. 30.

Figs. 29 and 30 represent the two sides of a partly formed octahedral crystal of unusual size and form. It was washed out of the gravel in a drift placer mine belonging to the Deidesheimer Brothers, at Forest

Hill, Placer County, California, in the year 1854. Its weight, including a fragment of quartz imbedded in one corner, is 247 grains. It measures in one direction along the basal edge, one-sixteenth inch=26^{mm}, and in the other, seven-eighths of an inch to fifteen-sixteenths=21 to 24^{mm}. The center is built up of a series of thin plates or ribs, parallel with the octahedral planes which show in the engraving as a series of lines. This crystal may be regarded as the skeleton or frame of the base of an octahedron, which, if completed upon the scale of the base, would have been about an inch in diameter, as indicated by the broken lines in Fig. 31.

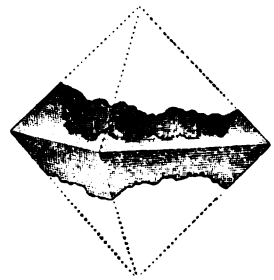


FIG. 31.

Elongated, distorted, and cavernous gold crystals.—Octahedrons of gold are frequently elongated, parallel with two opposite edges, thus forming an octahedron with a parallelogram for its base, examples of which are shown in Figs. 32, 33, and 34.

FIG. 32.

FIG. 33.

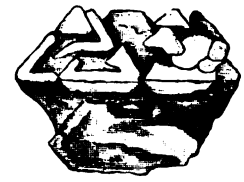


FIG. 34.

Figs. 32, 33, and 34 al so represent an elongated octahedron; Fig. 33 being an end view, and Fig. 34 a side view. This crystal is a good example of the imperfection of some crystals upon the principal planes or faces, exhibiting in this instance cavernous or depressed faces with also a succession of smaller implanted octahedrons arranged symmetrically. Length $1\frac{1}{8}$ inch nearly = 28^{mm}, breadth $\frac{7}{16}$ = 10^{mm}, weight 351 grains. From Placer County, California.

FIG. 35.

FIG. 36.

Examples of octahedra elongated in the opposite direction, as in Figs. 35 and 36, are also frequent, but they may generally be regarded as distorted and but partially developed crystals.

Fig. 37 represents a portion of an octahedral crystal found in Calaveras County, California. If it had been completed upon the scale of the portion found it would have formed an octahedron measuring 2 inches on the base as indicated in the figure. The specimen consists of one

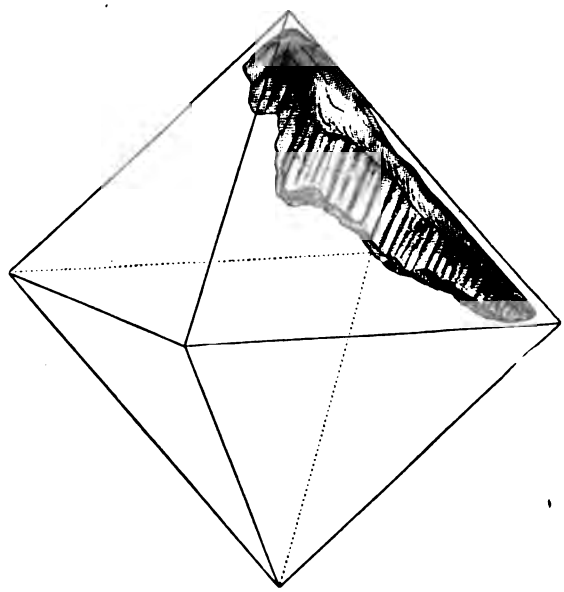


FIG. 37.

edge, parts of two octahedral planes and two solid angles. It is considerably rounded and worn by attrition. The edge is nearly 2 inches, 60^{mm} long.

It thus represents an octahedron with a base of 2 inches = about 6 centimeters square. This crystal was found in the wash gravel about the year 1861. It may truly be said that cavernous, hollow, and shrunken or partly formed crystals are the most common, and that the fully filled out and completed gold crystals are exceptional. The incomplete crystals have the appearance in each case of a failure for lack of material. There does not appear to have been any superfluous amount of gold in Nature's vaults, but generally too little, not enough to properly fill out and complete the crystallizations. Thus Nature, like some of her children seems to have been unable for want of sufficient gold to finish the structure on the scale upon which it was commenced.

Cubo-octahedrons of gold have been found in California as in Australia, but they are rare. A few crystals of this form have been taken out from Secret Cañon, near Downieville, in Sierra County. The planes are unusually brilliant and perfect. These crystals do not exceed 0.3 inch in diameter and are in groups. Fig. 3, p. 576, is a fair characteristic representation of the crystalline form of these crystals.

Brilliant crystals from the Princeton gold mine.—A few gold crystals of remarkable perfection and beauty were obtained in 1860 from the Princeton quartz gold mine on the Mariposas estate in Mariposa County, California, at a depth in the vein of about six hundred feet from the surface. They are implanted upon snow-white quartz in cavities and present groups and small aggregations of brilliant golden octahedrons

with small modifying planes. These crystals are generally less than one-quarter of an inch in diameter (about five millimeters). Some are solid, others cavernous and but partially filled out. The faces, however, have an exceptional brilliant, natural polish, and the grouping is exquisite.

The modification of form referred to is unique, and renders these crystals still more interesting and complete. Each of the octahedral edges is slightly truncated by a narrow plane, the regular dodecahedral plane which in this case presents a series of brilliant step-like notches leading up to the solid angles of the octahedron. These solid angles are replaced by very small triangular planes on each edge, forming by their intersection an obtuse apex to the octahedron and a star-shaped figure of great beauty. Unless examined with a strong glass and a bright light, there seem to be but four planes—one on each edge. Under favorable conditions of examination, each plane is seen to be formed of two, thus giving eight planes in pairs of two, and making a very obtuse angle one with the other. The form and arrangement of these planes is illustrated by Fig. 38, representing a complete crystal. The

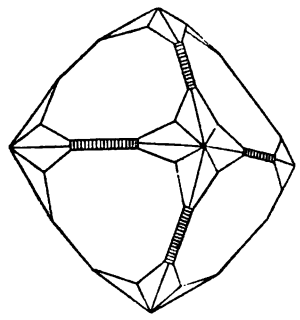


FIG. 38.

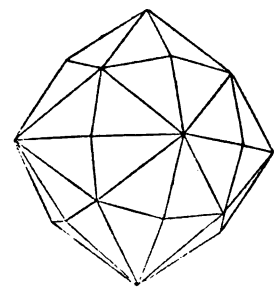


FIG. 39.

small planes, if extended so as to obliterate the octahedral plane, would produce a hexakisoctahedron, the solid called "adamantoid," by Haidinger, Fig. 39, because it is the form so characteristic of the diamond. The solid is also known as the "six-faced octahedron." Another crystal shows six additional minute planes on each of the points of the octahedron. The brilliant octahedral faces are beautifully striated in fine straight lines and in triangles. On some of the planes the striæ extend across the whole breadth of the face parallel to one of the edges and not to the other edges. The crystal, it will be seen, bears a general resemblance to that from Siberia, described by G. Rose, Fig. 13, p. 578, except that there are fewer planes, and in the California crystal there is no representation of the plane of the cube.

Another modification of the cube also occurs; a cubo-octahedron, exhibiting planes of the cube, the octahedron, and the trapezohedron.

Hemihedral modifications of gold crystals in California are rare, but a crystal of gold from California two-fifths of an inch in diameter, weighing 121.1 grains, and in the form of a pentagonal dodecahedron, is described by Prof. Chas. U. Shepard.* It is from the placer deposits, and, although somewhat worn, preserves traces of the raised edges characteristic of gold crystals from this State. Another pentagonal dodecahedron is described under the head of "gold in sheets and plates," page 584 of this article.

* Proc. Am. Assoc. for the Advancement of Science, VI, 231, 1851.

Arborescent branching or dendritic gold.—Specimens of arborescent branching gold are frequently of great beauty. Small specimens were found in working a quartz vein at Mameluke Hill, near Georgetown, California, several years ago. In El Dorado County, at Spanish Dry Diggings, a mass of irregularly-grouped dendritic and arborescent crystals was found weighing 16 pounds, and was sent to Paris in 1867. The gold of the celebrated Loud deposit in Lumpkin County, Georgia, is also dendritic, and grouped in irregular crystalline masses.

Irish Creek, near Coloma, in Placer County, California, is another locality which has furnished some remarkably fine specimens. One taken out in 1853 is beautifully arborescent on one side, forming a curved plate about 1½ inches wide, while the other side is covered with small but perfect octahedrons to the number of twenty or more, and from the one-sixteenth of an inch up to one-eighth or more in diameter.

FIG. 40.

FIG. 41.

The edges of all are slightly raised above the octahedral face, and one of the crystals is flattened parallel to a face, and to such a degree that it appears as a thin six-sided plate. The specimen seems to have grown from one point, and to have once been incased in peroxide of iron, as this substance fills some of the spaces. Length $2\frac{3}{16}$ inches; breadth, $1\frac{8}{16}$ inches.

Gold in moss-like aggregations is occasionally found. Some beautiful examples of this form were taken out of the White Bull mine, in Oregon, a few years ago.

GOLD IN SHEETS AND PLATES.

The occurrence of gold in thin sheets or plates from half an inch to two or more inches in breadth is characteristic of the mines of Transylvania. Such plates are rarely thicker than a visiting card, and are generally covered with crystalline lines and markings revealing a pervading geometrical structure which becomes more apparent at the edges of the plates. Some examples of this obscure crystallization have been carefully studied by Von Rath,* who finds the crystal to be complex twins or combinations of distorted tetrahexahedra.

Somewhat similar plates have been found occasionally at one of the mines at Grass Valley, Nevada County, California.

* Zur Krystalisation des Geldes Zeitschrift fur Krystallographie und Mineralogie. Erster Band, 1877.

One of the best examples of sheet or plate gold is from the "French mine," California, 1853. It measures 3 inches by 1½, and is about one millimeter thick. The whole surface is covered with triangular markings and projections like a tented field. These triangles are both faintly and strongly outlined. They are equilateral and appear to be the faces of incipient or flattened octahedra. Many of these measure three sixteenths of an inch across the bases, and have in the center, or toward one of the angles, a solid projecting pyramid of three planes, apparently the solid angles of the cube, rising above or through the octahe-

FIG. 42.

dral face. At the extreme end of the plate the crystallization becomes more distinct, and a fringe-like series of flattened octahedrons is developed. On one side of the plate, however, there is a single salient crystal standing out above the general surface showing several planes of a pentagonal dodecahedron; one of the very few examples seen of a hemihedral crystal of gold from California. The faces of this crystal are flat and brilliant near the edges, but are cavernous and hopper-shaped toward the center.

OCTAHEDRA WITH DIVERGENT PRISMS.

At Clancy, Clancy Creek, Jefferson County, Montana, minute crystals of gold were obtained by Dr. H. M. Hill, which present the novel appearance of an octahedral nucleus or head, with a long divergent brush-like attachment on one side or angle of the crystal, giving the whole the appearance of the drawings usually made of comets.

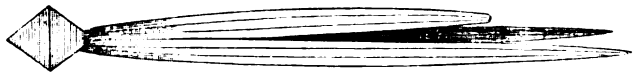


FIG. 43.

The total length of these crystals is about one-eighth of an inch, and the long prisms are consequently very small, and it is not easy to determine their precise form. They appear, however, to be hexagonal prisms. They are brittle and are easily detached from the octahedral head. There are some indications that they are formed by the twinning of octahedra. Their appearance suggests their artificial origin, possibly from the evaporation of quicksilver charged with gold.

WIRE-LIKE GOLD IN DOLOMITE.

An interesting example of a wire-like rod of gold penetrating a cleavage crystal of calcite, or pearl spar, with curved faces, is illus-

trated by Fig. 44. The gold protrudes from each face nearly at right angles, and appears to have been originally enveloped in calcite, now removed by cleaving. From near Armagosa, on the Mojave River, California.

FIG. 44.

The crystalline forms so far observed in California may be enumerated as follows: Cubo octahedron; octahedron; dodecahedron; hexakisoctahedron; trapezohedron (in combination); and the pentagonal dodecahedron, to which may be added plates; arborescent and filiform masses; sponge gold, an aggregation of fine crystals; prismatic or elongated forms, distorted crystals, chiefly flattened and elongated octahedra.

ARTIFICIAL CRYSTALLIZATION OF GOLD.

Crystalline gold may be obtained artificially by slow cooling from fusion, by electrolysis, and by the treatment of gold amalgam with nitric acid, or the slow evaporation of quicksilver from amalgam.

Crystalline facets and markings are frequently found on the surfaces, especially in the depressed surfaces of gold bars which have cooled slowly from fusion. In the manipulation of a mass of pure gold at the British mint, London, fine crystals were produced, and appeared to be an aggregation of octahedra.* In an article in the American Journal of Science upon certain artificial crystals of gold Mr. Albert H. Chester† states that in casting bars of pure gold for the manufacture of foil, traces of crystallization may may often be observed upon their upper surfaces. These are generally simple triangular faces slightly raised. Occasionally several faces of the octahedron may be seen, the edge in some instances being half an inch in length and quite sharp and well defined. The purer the gold the more likely the crystals are to form. The presence of a very small amount of copper seems to prevent it entirely.

The same writer describes the process of preparing crystalline gold by electrolysis for dental purposes. This process was patented in 1360, and consists essentially in the decomposition of a solution of chloride of gold and ammonium by the battery current, both poles being made of pure gold.

The gold is gradually deposited in bright crystalline flakes having the appearance of feathers or fern leaves when examined under the microscope. Another process for obtaining what was known as "sponge gold" was patented in 1853. This consisted in dissolving gold in quicksilver and then digesting with nitric acid. The quicksilver is dissolved, and the residue is a spongiform mass of minute gold crystals. Professor Chester found such crystals to have a prismatic form, apparently regular hexagonal prisms, with pyramidal terminations, of which he gives figures and measurements. The figure of the hexagonal prism

* Encyclopedia Britannica; article on gold.
† American Journal of Science and Arts, third series, Vol. XVI, July, 1878, p. 29.

represents a crystal about 0.5^{mm} in length and 0.06^{mm} in diameter. The angle $0 \wedge 1$ has been approximately determined to be about 136°, which would give for I (the prismatic plane) and 1, 134°. Such crystals contain 6 per cent. of mercury, which may be driven off by heat, leaving the gold somewhat spongy and not brittle, as before.

It is interesting that Le Sage, a mineralogist of the last century, describes, in 1777, the formation of gold crystals in prisms by the evaporation of mercury from gold amalgam. He describes the prisms, however, as square prisms, with square pyramidal summits, and regarded them as elongated octahedra.

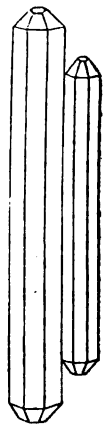


FIG. 45.

At Sonora, in Tuolumne County, California, the late Dr. Snell, of that place, gave the writer some minute prismatic crystals of gold which under the microscope, and even with a good pocket-lens, may be seen to be perfectly formed hexagonal prisms with brilliant sides and pyramidal terminations. There are no marks of twinning or compounding, but two or more prisms are sometimes attached side by side. The terminal planes are regular isosceles triangles. The angle between the prism I and the pyramid 1 is approximately 130°. These crystals separately appear to nearly agree in their form and angles with those described by Professor Chester, already referred to, page 586, and they may have been, and probably were, artificially formed.

GENERAL DISSEMINATION OF GOLD.

Gold is believed to be generally diffused in solution in the water of the ocean. This opinion was expressed by Wurtz in 1866, and Sonstadt in 1872 announced that the sea-water of the British coast contained gold, and by estimate to the extent of about one grain of gold to the ton of water. The metal is supposed to be kept in solution by the iodine liberated by the decay of organic matter.

There is a much greater dissemination of gold in a ragged granular condition *in situ* in fine particles in the midst of rock formations and without any obvious connection with veins than is generally supposed. Prominent examples are found in the belts or zones of layers of soft slate in Georgia and in North Carolina, one in Georgia being well-known as the "Pigeon-Roost streak," where the slates are rusty and decayed to such an extent that they can be washed down by a stream of water. Quartz veins or "ledges" are not visible, but after washing away the soft ash-like earth and iron-rust a residue is left which consists chiefly of fragments of thin sheet-like veins or inclusions of quartz which were enfilmed with the micaceous slate. These thin sheets of quartz are generally not much thicker or larger than a knife-blade, and this has suggested the name of "knife-blade veins," by which these thin seams are generally known. They are often very rich in gold, which ramifies through the substance of the quartz in a subcrystalline form. The gold at the Mameluke mine, Georgetown, Cal., occurs in a similar softened and decomposed slate, and is crystalline in its structure, occurring in moss-like dendritic and arborescent forms.

The Boly-Fields gold vein, on the banks of the Chestatee River, Lumpkin County, Georgia, is another example of the occurrence of coarse, ragged gold in the midst of a mass of slate without any defined quartz vein. In this locality the slate, being swept clean by the river, does not show any decomposition, and the gold can be seen protruding

from the cleanly-fractured masses of hornblende slate, and closely associated with bornite, pyrites, and dolomite. Such rock in decomposing would yield up a large amount of coarse, ragged, or "vein gold" without any other evidence of the existence of a vein.

The dissemination of gold in the schistose rocks of North Carolina has been noted by Professor Kerr,* who describes the Rhodes mine, in Gaston County, as a body 9 to 12 feet thick of decomposed light gray gneiss with strings of quartz. And at King's Mountain, in the same county, gold is obtained not only from seams of quartz in a bluish-colored hydromicaceous schist, "but a 60-foot ledge of grayish-blue fine-grained schistose limestone is quarried out bodily and sent to the stamps." Dr. Emmons has also noted that the quartzite schist is gold-bearing over wide tracts of country. It is easy to understand that in the erosion and surface-washing of vast areas of gold-bearing rock, especially where such rocks have become softened and decayed to a depth of from 10 to 50 feet or more, there would be a great accumulation of gold without much evidence of quartz veins.

There are other facts which show that there is a wide distribution of gold in the mass of rocks irrespective of regularly formed quartz-veins, and of the geologic age of the formations. Prof. Charles A. Schæffer has described† a district in Williamson County, Texas, of horizontal strata of porous ferruginous rock, underlaid by finely granular limestone of the age of the Cretaceous, where gold occurs in small quantity entangled in the pores and crevices with oxide of iron derived from the decomposition of pyrites. The existence of a minute quantity of gold in the clays underlying the city of Philadelphia is well known.

GOLD IN SULPHURETS.

The usual association of gold in quartz veins with sulphurets is well known. In gold regions the sulphid of iron (iron pyrites) is generally gold-bearing, as is also the arsenid of iron (arsenical pyrites or mispickel). The gold in these sulphides and arsenides is probably diffused mechanically and not in chemical combination as some have claimed. The experience of many years in the examination of gold veins and gold ores sustains the conclusion that the gold is mechanically diffused. Although the metal is generally invisible in the undecomposed and brilliant crystals of pyrites it becomes apparent when such crystals are decomposed by oxidation either through the slow natural agencies of moisture and air or by artificial means. Decomposition by nitric acid is frequently resorted to as a test of pyrites for gold. As a result of such decomposition we frequently find particles of gold ragged in form, but of comparatively large size. So also when pyrite is changed to limonite by oxidation and without losing its form, gold which probably was before the change scarcely visible becomes distinctly visible in contrast with the brownish-red color of the iron oxide. Deflagration of pyrites with nitrate of soda ("Holland's process"), which is simply another method of oxidation of pyrites, also liberates gold from auriferous pyrites, and permits it to be seen when the oxide of iron is washed away. Roasting produces the same result.

In amalgamating gold ores it is common to find that fragments of either raw or roasted pyrites, but more especially the roasted, adhere

* Some peculiarities in the occurrence of gold in North Carolina. Transactions Am. Inst. Min. Engrs., X, 475.

† Transactions Amer. Institute of Mining Engineers, XI, 319.

to the quicksilver by a single point only, where the gold comes to the surface and finds contact with the quicksilver. Crushing and grinding the pyrites also liberates the contained gold, but has the disadvantage of breaking up the ragged gold at the same time, and the color of the pyrites is often so nearly like the gold that it is difficult to distinguish one from the other. Mr. H. G. Hanks* describes large crystals of pyrite from a mine in El Dorado County, California, on the surface of which small globular masses of gold may be seen. The opinion that gold is mechanically and not chemically disseminated in pyrites is defended by Adolph Ott, Henry Wurtz, and others. Ott† gives several good reasons in support of his opinion, and cites Bergmann, who as early as 1735 showed by digestion in nitric acid gold to exist in pyrites in small angular grains, thus proving the metal to exist in the state of simple mixture, and not of composition in the pyrites.‡ Joseph Black appears to have held the same opinion.§

There is also good reason to believe that the gold in pyrites is generally in a crystalline condition, not compactly aggregated, but spread in a net-work in parallelism with the crystalline planes of the pyrites, forming a rude crystalline skeleton or crystalline fragments. The late Prof. John Torrey, of the United States assay office, showed that after the treatment of pyrites with nitric acid gold appears under the microscope in laminæ and in filiform and spongy particles.

An interesting example of spongy gold occurring in the mine at Angel's camp was brought to my notice by the late Dr. Hill. It has the appearance of precipitated gold and the form apparently of a crystal of iron pyrites, looking as if it had been aggregated in a cavity left by decomposing pyrite. It is very light and is easily impressed and burnished by the nail. It is a good example of spongy crystalline gold of natural origin.

FLAKES OF GOLD IN SEAMS OF PORPHYRY.

There is a fine example of the occurrence of free metallic gold in porphyry at the Contention mine, Tombstone, Arizona. This gold is found chiefly in the thin cracks and cleavage surfaces of the partially decayed porphyry, and it appears to have been deposited there from solution and not mechanically. It occurs in thin subcrystalline flakes and scales, and may have been derived from the decomposition of the iron pyrites with which the adjoining sedimentary formations are charged. Small implanted cubical crystals of silver chloride are found in close association. The average value of the ores as worked in silver and gold was about seventy dollars per ton, and the gold constituted from 20 to 25 per cent. of the value of the product.

PLACER GOLD AND NUGGETS.

The size of the fragments of gold in streams depends, of course, primarily upon the size of the masses in the parent source. Wherever veins furnish large masses of gold of great weight and solidity, coarse and heavy nuggets are found in the adjacent detrital deposits. If the veins have yielded fine particles of gold only, the gold in the placers below is

* Report of the State Mineralogist, 1884, page 192.
† Adolph Ott, Jour. Franklin Institute, 1878, page 128.
‡ Fourcroy's General System of Chemical Knowledge, vi, p. 489, 1804.
§ Black, Lectures on Chemistry, III, 384.

in fine scales, or may have mostly disappeared by reason of the violent currents of water and the wear and tear to which all placer or wash gold is subjected. As a rule, gold in the beds of rivers becomes smaller and lighter the further it is carried down the valley by the force of the stream. It is subjected to constant wear by attrition and pounding, especially where the current of water is swift enough to move the bowlders and gravel down to the bed-rock. The size of the gold generally bears a direct relation to the size of the bowlders. But there may be frequent exceptions to this generalization respecting the size of gold in river beds, for side valleys may introduce gold which was not moved far from its original source, and the river may intersect some new source of gold, such as a group of veins or some ancient river channel carrying very coarse gold. This change in the nature of the gold in the beds of rivers is well known. Each river bar may be said to have its own peculiar type or condition of gold, and expert gold-merchants in the chief mining camps soon become so well informed respecting the form and appearance of gold dust that they can identify at a glance the gold from each bar or placer, from each valley or "diggings" in their neighborhood. Gold thus has, it is evident, characteristic forms, or a "likeness," by which those accustomed to it can recognize it and name its source. The color and general condition of the surface of the gold grains are also important characters. When the gravel is small and well rounded by attrition, the gold is generally small and scaly. It is a well-known fact that in most of the California rivers in the gold region, such as the American, the Feather, the Yubas, the San Joaquin, the Merced, and others, the gold at the foot-hills of the Sierra Nevada, where the gravel is smooth and round, is in small scales, also well rounded and worn.

In a sample from the American River, near Coloma, mined in 1849, these scales measure on an average less than one-sixteenth of an inch = one millimeter in diameter.

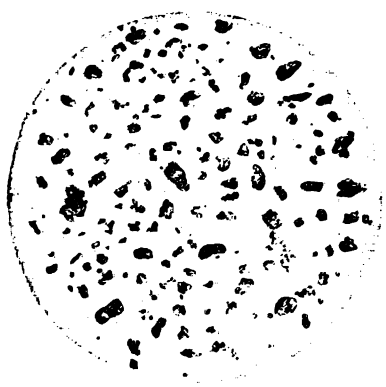


FIG. 46.

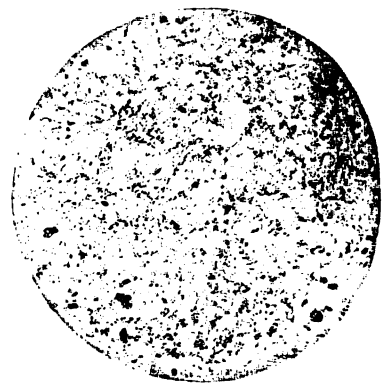


FIG. 47.

The scale-gold from the San Joaquin River and from the Fresno River is still smaller and more even in size, and compares best with the fine scale-gold from the ocean beach at Port Orford, Oregon.

Similar-scale gold is found in some of the extinct river channels, notably

in the deep channel at Red Dog and at You Bet, Placer County, California, where the gravel is in some places literally packed with small scale-gold. The gravel is much worn and rounded, showing the continued action of running water. There are certain streams which afford gold

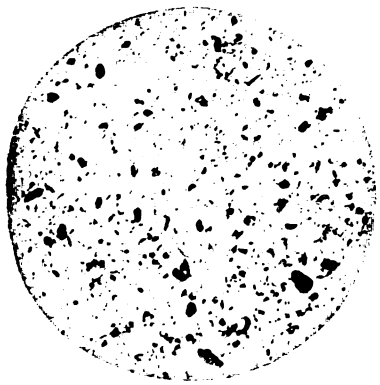


FIG. 48.

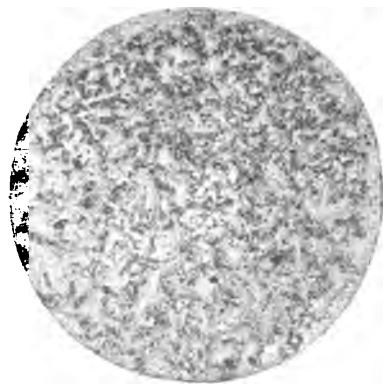


FIG. 49.

in small rounded grains or pellets, rather than in scales. The Boisé gold dust is an example. The grains are much thicker and heavier than the grains of the same breadth from the California rivers.

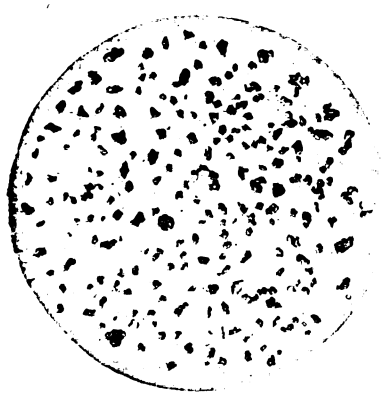


FIG. 50.

FIG. 51.

In most of the drift-mines upon the ancient river channels where the bowlders are large and heavy, the gold is also heavy and coarse, although well rounded and worn. The sample from which the illustration (Fig. 51) is drawn was taken out of a drift-mine in Georgetown, Cal, 1854. The angular and semi-crystalline gold from veins and slates is in strong contrast with the well-rounded and water-worn samples, as shown in the two following illustrations, one from the angular gold of the Mameluke vein, Georgetown, Cal., and the other from the Loud deposit, Lumpkin County, Georgia.

The placer or wash gold of the San Francisco River, above Clifton, Ariz., is in irregular scales, rather thicker and heavier than the gold of the American River.

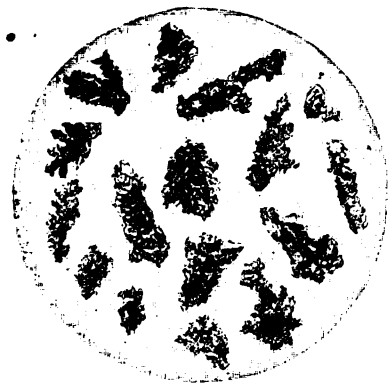


FIG. 52.

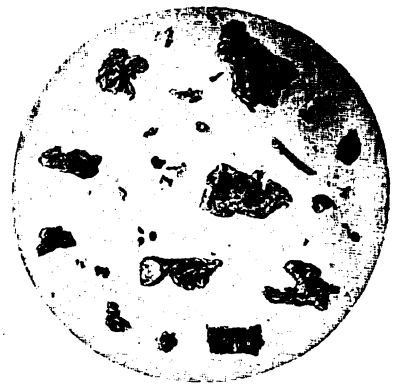


FIG. 53.

The placer gold of the Black Hills, Dakota Territory, is most ancient in its origin, being pre-Silurian in its formation and its distribution. It was broken out from its matrix in the veins and was distributed over the floor of upturned Archæan schists when the foundations of the Potsdam sandstone were laid. It occurs at Deadwood, according to Devereux,* in smooth rounded grains slightly flattened. It is finer in composition than the Homestake vein gold, this being the vein from which the placer gold appears to have been derived. Such a difference of fineness is not unusual in placer gold, which is generally finer than the gold unbroken from the vein which supplied it. And that this greater fineness is due largely, if not wholly, to the loss of silver, its natural alloy, at and near the surface of the grains and masses of gold is shown by a series of assays made to determine this point, some of the assays being of the coarse gold and some of the smaller grains, the latter for equal weight exposing a greater surface than the coarse gold. The smaller grains were found to contain less silver than the coarse grains.

Another very interesting fact noted by Mr. Devereux in his paper is that where igneous dikes traverse the ancient gold deposits, and notably at the place known as Bald Mountain, the gold has largely disappeared near the dikes, although the original conditions for its occurrence were favorable. It appears to have been dissolved out near the dikes by some powerful solvent. That this is the true explanation of its absence is made more probable by the fact that some coarse pieces which, though similar in shape to others, had lost the characteristic smooth-worn surfaces of the wash gold and had acquired a corrugated roughened surface, such as metals acquire when undergoing solution. Such pieces did not, however, show traces of crystalline structure. It is stated also that gold in thin films has been found on the surfaces of the schists to a depth of several feet, with all the appearance of having been deposited from solution, this gold being probably the same that was dissolved out of the deposits by the solvents in connection with the dikes. Schists

* Transactions American Institute Mining Engineers, X, 468.

so coated or gilded with gold have been found to pay for milling to a depth of 10 feet, where the gold generally gives out or is not present in sufficient quantity to pay.

Gold which occurs as a mere film, like gilding, on the surfaces of rocks, or limonite, rarely pays for working. It is difficult to save. It is often found in this condition upon pyrites, and has been seen also upon massive hematite.

LARGE MASSES OR NUGGETS OF GOLD.

Masses of gold of unusual size and weight, now generally known as "nuggets," are found in all gold regions. The gold fields of Victoria, Australia, have yielded the largest masses yet discovered. In 1858 the celebrated Welcome nugget was found at Bakery Hill, Ballarat. This weighed 2,195 ounces troy, or over 182 troy pounds. The Blanche Barkley nugget is said to have weighed 146 pounds, and of this only 6 ounces was rock. The largest mass of which we have any record from California was taken out of the great vein at Carson Hill, in Calaveras

FIG. 54.

County, and weighed, according to Mr. T. Deer, one hundred and eight pounds, of which four pounds' weight was quartz. This is probably avoirdupois weight. Masses weighing five or ten pounds were numerous. The weight of the largest mass is variously stated. By some it is said that the mass weighed one hundred and sixty pounds, part of which was quartz. In the State Mineralogist's report the weight is given as one hundred and ninety-five pounds (= 2,340 ounces) and the value as $43,534.

A table giving the weight of the largest masses found in the principal gold-producing countries is added to this article. For most of the items respecting the nuggets from California, I am indebted to the reports of Mr. H. G. Hanks, the State Mineralogist of California, and for those of New South Wales to the reports of Prof. A. Liversidge.

Cabarrus County, in North Carolina, has furnished some large specimens of gold from the Reed placer washing, on Meadow Creek. One mass weighing about thirty-seven pounds troy (twenty-eight pounds avoirdupois) was found there in the year 1803. The first piece of gold was found in the year 1799 by a boy named Conrad Reed. In 1824 a nugget weighing sixteen pounds was found, and in 1835 another weighing thirteen and one-quarter pounds, besides several smaller nuggets weighing from one to nine pounds, the total weight of nuggets being one hundred and fifteen pounds avoirdupois. The largest mass is described as shaped like a smoothing-iron.

In Georgia some large masses have been found in the Nacoochee Valley, White County, figures of which of full size are given in the Mining Magazine.* The largest mass weighed 387 pennyweights, the second in size 115 pennyweights, and the third 3.59 pennyweights. A figure of the 387 pennyweight mass of full size is annexed. (Fig. 54, p. 593.)

At the celebrated Loud deposit, in Lumpkin County, Georgia, the largest mass ever taken out weighed 737 pennyweights; several have been found which weighed from 150 to 177 pennyweights.

List of some of the principal California nuggets.

Date.	Locality.	Weight.	Value approximately.
	Calaveras County.	*Ounces.*	
1854	Carson Hill, n. Angel's camp quartz vein, 195 pounds, 4 pounds quartz.	2,340	$43,534 00
1854	Camp Seco, Stone cabin gulch. Frank Russworm	93	1,760 00
	Mokelumne River. Said to weigh from 20 to 25 pounds.	.....	.....
	Placer County.		
1864	Michigan Bluffs, 2 miles distant on the American River	226	4,204 00
1876	Polar Star claim, Dutch Flat, from a white quartz bowlder	.....	5,760 00
	Sierra County.		
1855	French ravine	532	10,000 00
1851	.....do	426	8,000 00
1850	.....do	263	4,893 00
1860	.....do	93	1,757 00
1864	Smith's Flat	140	2,605 00
1869	Little Grizzly	107	2,000 00
	Hope claim	94	1,770 00
1866	Smith's Flat	146	2,716 00
1860	Monumental quartz, Sierra Buttes (W. A. Farrish)	1,596	17,655 00
1854 / 1862	Live Yankee claim, Forest City, 12 nuggets, from 30 to 170 ozs	30 / 170	..... / .....
1861	Smith's Flat	80	1,509 00
	Oregon Claim, Forest City, nuggets, from 30 to 100 ozs	30 / 100	..... / .....
	Minnesota	266	5,000 00
	Butte County.		
	Willard claim, west branch of the Feather; weight 54 pounds before melting, and 49 pounds after melting.	.....	.....
1862	West branch Feather, near Magalia. (Morrison.)	.....	1,607 00
1865	West branch Feather, near Magalia	.....	1,760 00
	Shasta County.		
	Banghart mine, Mad Mule cañon, crystalline. (Cooper.)	13	246 00

* Mining Magazine, second series, Vol. II, p. 265, 1861.

List of some of the principal California nuggets—Continued.

Locality.	Weight.	Value approximately.
Nevada County.	*Ounces.*	
emington hill, estimated to weigh	186	$3,500 00
...do	128	2,400 00
owell Hill	58	1,100 00
Siskiyou County.		
e Greots, Terry, and Klamath Rivers	131	2,437 00
El Dorado County.		
linois Canyon, near Georgetown		1,000 00
eorgia slide, Hudson's Gulch		1,000 00
regon Cañon, supposed to be the Fay nugget		1,250 00
elsey, or near it; date not stated		4,700 00
anhattan Creek, near Georgetown		
arden Valley. Found by Samuel Treeworgee		525 00
panish Dry Diggings. Grit claim, dendritic gold (Fricot's specimen)	101.40	3,500 00
llet Hill. Bowlder of gold quartz	426	8,000 00
panish Dry Diggings, Pennsylvania seam, 2½ pounds	36	5,000 00
panish Dry Diggings, near the Grit seam. (Texas & Jacobs)		1,100 00
Tuolumne County.		
ood's Creek, below Sonora	900	
napp's Ranch, east of Columbia. A slab-shaped mass, 14″ x 9″ x 5″, which, with other fragments	396+	8,500 00
ullivan's Creek, 28 pounds	408	7,590 00
old Hill, near Columbia	360	6,500 00
pring Gulch, near Columbia. (Globular form)		5,000 00
olden's Garden, Sonora. A mass of quartz and gold		30,000 00
olumbia	283	5,265 00

RUSSIA.

Russia, according to Sir Roderick Murchison,* the very heavy pé- or lumps of gold, evidently portions of very rich vein-stones or of ore, have been found around the zavod of Zarevo Alexandrofsk. e time of his visit the pepites weighed 24 pounds 68 zolotniks. s had been found weighing from 13 to 16 pounds, Russian. er Sir Roderick left Russia, about 1843, a nugget was found at this ty which weighed 78 English pounds. This is doubtless the same

FIG. 55.

nen usually described as weighing 96 pounds troy, which is pre- l in the Institute of Mining Engineers at Saint Petersburg. Kok-

* Russia in Europe and the Urals, I, 489.

scharof no doubt refers to the same specimen in his work* on the minerals of Russia when he describes a nugget found in 1842 weighing 2 poods, 7 pounds, 92 zolotniks (Russian), or 88 Russian pounds. In his Mineralogy of Russia he gives a figure of the remarkable mass weighing 56 zolotniks, deposited in the Museum of the Mining Institute at Saint Petersburg, and already referred to in this article, page 576. An outline copy of one of the figures is here given.

SOUTH AMERICA AND AUSTRALIA.

According to Dana, Mineralogy (5th edit., p. 8), nuggets of gold 1 to 50 pounds in weight were taken from a mass of rock which fell from one of the highest mountains in Paraguay, South America.

List of some of the principal nuggets found in New South Wales‡ and Victoria.

Date.	Locality.	Weight.	Approximate value.
	NEW SOUTH WALES.	*ozs. dwts.*	*£ s. d.*
1851	Meroo Creek, 58 miles from Bathhurst. One weighed 70 pounds avoirdupois and gave 60 pounds troy of gold. The other two weighed about 60 pounds each, and from the three 106 pounds troy were taken		
1851	Meroo Creek, another nugget, 30 pounds 6 ounces	366	
1852	Meroo Creek, 1 nugget	157	
1852	Meroo Creek, 1 nugget	71	
1852	Bingera	26	
	Buwanding, n. Orange, mixed with quarts and iron pyrites, gross weight (troy) 107 pounds 2 ounces 8 dwts	1,286+	4,289 8 10
1852	Meroo Creek, "king of the water-worn nuggets"		
1851	Meroo Creek, 24 No. 1. The Brenan nugget measures, 21 inches in circumference	264+	1,156 0 00
1861	New Chum Hill, Kiandra	200	
1860	Sunoy River, Kiandra	160	
1860	Tooloom Diggings (nearly solid gold)	140	
1860	Kiandra, Snowy River	93 18	
1852	Louisa Creek (a solid lump)	82	
	Gundagai (new diggings)	64 7	
1857	Laura Creek (gold and crystallized quarts)	50	
	New Chum Hill, Kiandra	42	
1851	Summer Hill Creek (one of the first found)	13	
	McGuiggan's Lead	22 18	
1874	McGuiggan's Lead is reported to have had one nugget and others as follows: 7 ounces, 25 ounces, 35 ounces, 37 ounces	134	
1876	McGuiggan's Lead	36	
1876	Wapping Butcher, near Parkes	19 12	
1879	Nundle Gold Fields	43	
1879	Nundle Gold Fields	23	
	Broad Gully, Braidwood district	32 15	
1876	Canadian Lead, near Gulong	64 3	
1874	Wood's Flat	65	
1874	Wood's Flat	50	
	Whipstick Flat, Kiandra, 28 pounds		
1880	Temora, 99 ounces, 84 ounces, 76 ounces, 72 ounces, 68 ounces, 64 ounces, 63 ounces, and one of 59 ounces 1 dwt., and several others during the same year		
1882	Temora	153 17	
1880	Nenigundah	13 15	
	VICTORIA.		
1858	"Beauty," Kangaroo Gully, Bendigo	342	
1861	"Platypus," Robinson Crusoe Gully, Bendigo	377 6	
1870	Viscount Canterbury, John's Paddock	1,105	
1872	"Schlemm," including 60 ounces quarts	538	
1872	Broomfield's Gully, Creswick	24 3	

* Materialen Zur Mineralogie Russlands, VI.

† The Russian pood = 36 pounds 2 ounces avoirdupois, and there are 96 zolotniks in a Russian pound = 14 oz. 7 dr. avoirdupois.

‡ Compiled from "The Minerals of New South Wales," by Archibald Liversidge, F. R. S., 1882.

List of some of the principal nuggets found in New South Wales and Victoria—Continued.

Date.	Locality.	Weight.		Approximate value.		
	VICTORIA—Continued.	*ozs.*	*cwts.*	£	*s.*	*d.*
71	"Rum Tow," Catto's Paddock, Berlin diggings	718	5			
70	"Viscountess Canterbury," Berlin diggings	884	10			
72	"Crescent," Berlin Diggings	176	8			
71	Nugget, Creswick	32				
	Oldham nuggets, Turton's Creek, from 2 ounces to 36	36				
72	Spondulix, Eureka Gully, Jordan's (29 ounces quartz)	130				
73	"Alma I"	125				
72	Broomfield Gully, Creswick	46	15			
72	Red "Red Streak Lead"	30	1			
75	Buninong	58	5			
73	Upper Boggy Creek	29				
71	"The Needful"	246	16			
73	"Alma 2"	15				
73	"El Dorado,"	170				
75	"Lothair," Clune's, 307 feet down	77	6			
75	Sandhurst, Crusoe Gully	46				
	Ballarat, Golden Reef claim	31	5			
858	"Welcome," Bakery Hill, Ballarat	2,195				
	"Blanche Barkley Nugget," with 6 ounces quartz, weighed 146 pounds	1,722				

SEPARATION OF SILVER AND GOLD FROM BLACK COPPER AT OKER.

By T. Egleston, Ph. D.

e ores which are treated at Oker come for the most part from melsberg, near Goslar, in the Hartz Mountains. They are lead mixed with pyrites, blende, chalcopyrite, barytes, and from 25 to er cent. of sulphur. They contain, besides small amounts of manse, cobalt, nickel, bismuth, arsenic, and antimony.

ey are divided into five classes, two of which are treated as lead and three as copper ores. The poor lead ores contain about 9 per of lead and 5 per cent. of copper; the rich ones 12 per cent. of lead ½ per cent. of copper. The rich copper ores carry 15 per cent. of er and 4 per cent. of lead; the poor ones 8 per cent. of copper 2 per cent. of lead. They all contain silver and gold, the silver g from .01 to .02 per cent., and the gold between .00005 and .0001 ent. All the ores are roasted for the manufacture of sulphuric except the lead ores. Of these, only those which contain 35 per of blende and 25 per cent. of pyrites can be used for this pur-. The acid made is usually sold, the weak mother liquors being for the separation of the silver from the copper. The working of e ores comprises seven distinct processes. They are mainly interg for the separation of the silver and gold, which is done in several , only one of which, the separation from black copper, is to be deed in this article.

ie processes by which the ores are treated are:

The lead ores are first roasted and then leached with water to ex- the zinc sulphate. This purifies the lead ores and gives a zinc sule containing 3 per cent. of impurities, the greater part of which is ganese. It is melted in its own water in a copper vessel, sifted to rate the large pieces, and sold.

ie lixiviated ores contain lead, copper, and silver. They are treated iltz furnaces, which give lead and a lead and copper matte. The er matte produced is roasted and is charged in a furnace 6 meters and 1.50 meters in diameter at the throat. The throat is closed double doors 1.25 meters square. The top of the furnace is made on, and constitutes the chimney. As the ore contains 20 per cent. pper, the charge is made up of 75 centners of roasted ore, 25 of ued, 20 of rock with only a small amount of copper, 50 of slag, or centners altogether; 213 centners are put through every 24 hours. the charge 60 pounds of coke are used. The product is about 80 ners of mattes at 35 per cent. of copper. Krum furnaces were forly used here. There are still four of them standing, but they are e torn down and replaced by Piltz furnaces. The Piltz furnaces a slag-hole and two tap holes, one for matte and one for slag. The runs into cones .45 meter in diameter and .75 meter deep. The e is tapped into a basin. There are eight lead furnaces.

The mixed ores containing lead and copper are roasted and smelted,

producing a lead which contains silver and a copper matte which is treated with the other copper mattes. The lead is cast in little round cakes .20 meter in diameter and about .16 meter thick. They contain a great deal of copper. To purify the metal it is melted in large iron kettles holding about 10 tons. The scums taken off are liquated in the next kettle and are treated for copper.

The silver lead is cupelled in cupel furnaces, of which there are three, two with movable hearths, and one with a fixed one. They all work with coal. As there is an easy sale for the litharge, the lead is purified in the kettles and all the pure litharge saved and sold. The screening is done in an ordinary trommel. The litharge is packed in barrels. There is no special arrangement for taking off the lead vapors, and cases of lead-sickness are quite common. It would be very easy to protect the men if the old ways of doing things were not kept up. Nothing is more remarkable about these works than the way old processes have been preserved.

3. The rich copper ores are smelted for a matte of 35 to 40 per cent. copper, concentrated to 66 to 70 per cent. smelted to black copper and treated for silver.

4. The ordinary copper ores are roasted with salt, leached with weak acid, and precipitated with iron or iodides.*

5. The concentrated mattes and the cement copper are treated in a reverberatory furnace. The silver is concentrated in bottoms, part of which is cast into plates for the electrolytic process, and part is granulated for the extraction of silver. The rest is copper poor in silver, which is sold.

6. The granulated copper is treated with weak acid for copper sulphate and the gold and silver residues smelted.

7. The silver is parted by solution in sulphuric acid and precipitated with copper.

The process of the separation of the silver from the black copper consists of several operations:

(1) Granulating the black copper.

(2) Solution of the black copper granules in the acid mother liquor.

(3) Crystallization of the copper sulphates so as to retain the insoluble residues.

(4) Solution and classification of the sulphate crystals.

(5) Treatment of the silver and gold residues.

(6) Crystallization of the copper sulphate.

1. GRANULATION OF THE BLACK COPPER.

The silver is concentrated in bottoms in such a way as to make them almost entirely free from iron, cobalt, and nickel, whose presence is objectionable because these metals gradually increase in the mother liquors and make the quality of the product impure, unless they are from time to time withdrawn from the circulation and treated for these metals. The iron sulphate cannot be separated from the copper sulphate without a special oxidation to make insoluble sesquioxides. The nickel and cobalt could be crystallized out, but this complicates the process unnecessarily, so that they are separated as far as possible in the dry way. The silver having been concentrated in the copper in a reverberatory furnace, is ready for treatment and is granulated as it is cast from the furnace.

* Trans. Am. Inst. Min. Engs., May, 1885.

APPARATUS AT OKER

FOR THE

Extraction of Silver from Black Copper

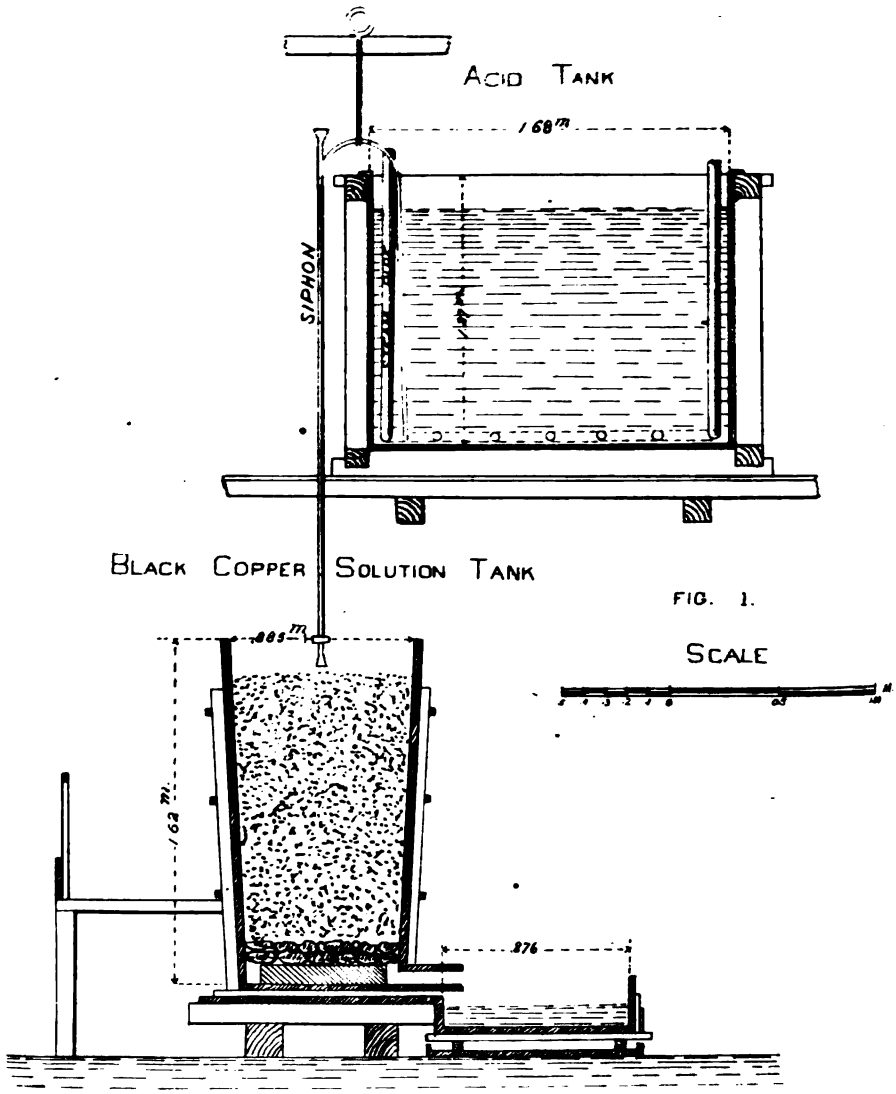


FIG. 1.

SCALE

concentration makes it possible to produce about half the copper
› at these works to contain only .07 per cent. of silver, which is so.
that it is sold. The other half contains .16 per cent., and this is
ulated. The object of the granulation is so to multiply the surfaces
ıntact that the solution may be made in the shortest possible time.
done by causing the copper to run in a thin stream from the furnace
a water-tank into which a stream of water runs continuously to
down its temperature. The copper is made to run across this stream
ıter. If it is at the proper pitch and temperature the granules are
ed perfectly, but there are many precautions to be observed. The
er must be sufficiently refined, and at as low a temperature as it will
to avoid the danger of not cooling the copper sufficiently. The depth
e water and the supply must be sufficient to have the water cool
gh at the bottom to insure that the copper will remain solid. To
ə this certain, the cold-water supply in some works is divided; one
in at the top, crossing the copper stream to scatter the copper; the
r is carried down by a pipe to the bottom of the tank, to insure the
ng of the mass there. If the copper is very hot, or the stream of metal
apid, or the supply of water not sufficient, there might be danger
e copper being at such a temperature as to undergo only such a
rficial cooling that, when it is altogether in mass at the bottom of
ank, it will readily become liquid again. The grains are sometimes
hollow,* but this is done only when the copper is to be oxidized in
nace, and not, as in this process, by means of air and sulphuric

OLUTION OF THE BLACK COPPER GRANULES IN THE ACID MOTHER LIQUOR.

ıis is done in a large building with several stories. In the upper
here are four lead-lined vats, 3.60 meters long by 1.70 meters deep,
meters wide, in the clear. (Fig. 1.) They are held together in
es which are 15 centimeters square. The whole vat before putting
e lead is painted inside and out with tar to prevent the absorption
ss of the liquors in case of a break in the lead lining. All the wood
ıe building is treated in the same way. These vats are heated by
n to 70° R. At the end of every row there is a tank one meter
re in which the steam is condensed. The lead to line the vats weighs
; to twelve pounds to the square foot. The pipe for heating the
ır lies on the bottom of the tank and turns on itself seven times.
of lead .05 meter in interior diameter and .005 meter thick; both
of the pipe are turned up. In each one of these vats there are
lead siphons, each one of which has a stop-cock at the bottom to
late the flow of the acid, and a funnel on the side with which to
; it. They are supported from the roof. Each one of these siphons
nunicates with the copper-solution vats below. (Fig. 1.) The spent
ors from the crystallization-tanks are pumped up into the acid-tank
a Kortings injector made of lead, the points of which are made of
hard lead. The liquors are concentrated with fresh acid at 50° B.
)° B., and the acid mother liquors made to flow over the granulated
ɛ copper contained in the leaching-vats below. These are conical,
ıeter in diameter above and .72 meter in diameter below and 1.62
rs high. On the bottom of the tank, on both sides of the bottom
ng, pieces of wood about .15 meter high are placed. (Figs. 1 and

* Trans. Am. Inst. Min. Engs., Vol. IV, p. 297.

2.) Over these a few large pieces of copper are laid so as to prevent the grains from passing through them, thus forming a false bottom. The tank is then filled with the granulated copper.

Between the real and the false bottom there is an opening .10 meter in diameter, with spout 0.38 meter long, which projects over a shallow launder 0.88 meter wide. (Fig. 1.) These tanks are hooped on the outside and lined on the inside with lead, 16 to 18 pounds to the square inch. The acid mother liquor is turned on to the granulated copper by the siphon-cock until it is wet. The acid is then turned off and the air left to act on the grains of copper, which it does rapidly, as the surface of copper exposed to the action of the air which draws up through the mass is very large. The outside of each grain is thus transformed into a very thin, black film of oxide of copper. The acid is then turned on again and dissolves out the oxide thus formed. This is repeated every three-quarters of an hour. The clear color of the liquor running out shows when the oxide of copper has been dissolved, and the liquor is then turned off until the black film forms again. As the copper dissolves out the tank is filled up.

3. CRYSTALLIZATION OF THE COPPER SULPHATES SO AS TO RETAIN THE INSOLUBLE RESIDUES.

The solution vats are placed in a line (Fig. 2); in front of them are slightly inclined launders lined with lead, which communicate with a series of others at right angles to these. The liquor flows over the bottom in a thin stream, and as the temperature is very much lowered by the exposure to the air of such a very large surface, the crystals of copper sulphate deposit on the bottom of the launders.

These launders are arranged in three double rows for every six solution tanks, the first one being 20 meters long and the two others only 9 meters. Between each set of two troughs there is a doubly-inclined table (Fig. 3), covered with lead, on which the crystals as they form on the bottom are thrown to drain. The distance between the two troughs is 2 meters. The width of the aisle between each set of troughs is 1.50 meters. The total length of all the troughs is 106 meters, and they have 93 square meters of surface. At every angle a little dam is made to make the liquors fall over it and thus further to cool it. When the crystals have accumulated on the bottom sufficiently they are detached with shovels and thrown up on the inclined tables to drain. After they have drained they are washed with water supplied by four tanks, three by 2 meters and 1 meter deep, placed on one side of the tables, in order to remove the acid mother liquors, and after they have again drained are collected in barrows to go to the solution vats. As no attempt is made to separate it, all the insoluble material which comes from the copper is taken up with the crystals as they form. These are cleaned up two or three times a day, the strength of the solution being kept as nearly uniform as possible. The spent liquors are run into a tank 2.40 meters square, from which they are again pumped up by an injector to be used again. The crystals which form nearest to the solution tanks are the richest in precious metals. Those which form at the end contain less silver and considerable gypsum. The fine material, which remains a long time in suspension, is composed mostly of compounds of arsenic, antimony, and lead. All of the crystals must be sorted according to their composition. This is done by keeping separate all those taken from the different parts of the launders. In this way the residues are classified at once into rich or poor, pure or impure.

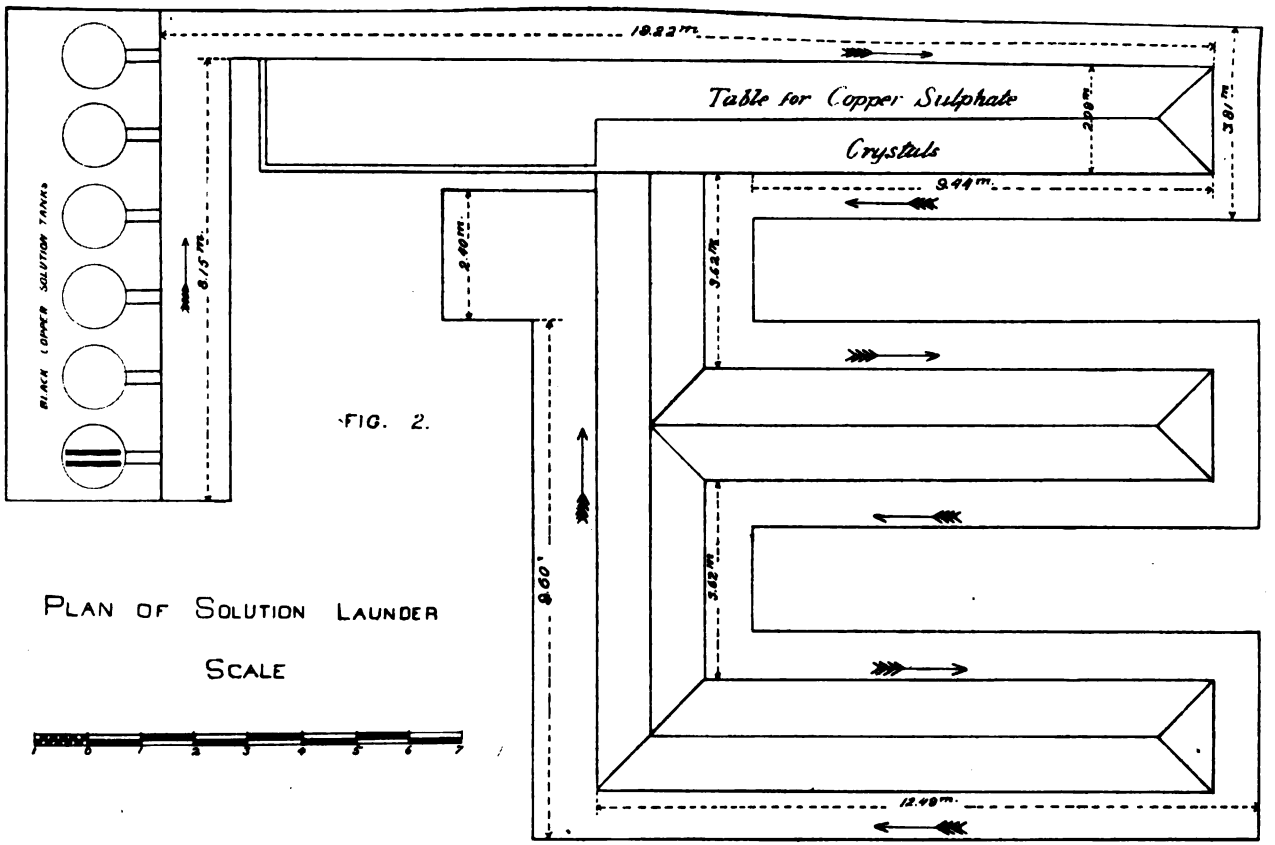
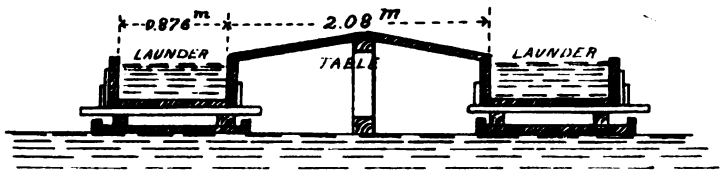


FIG. 2.

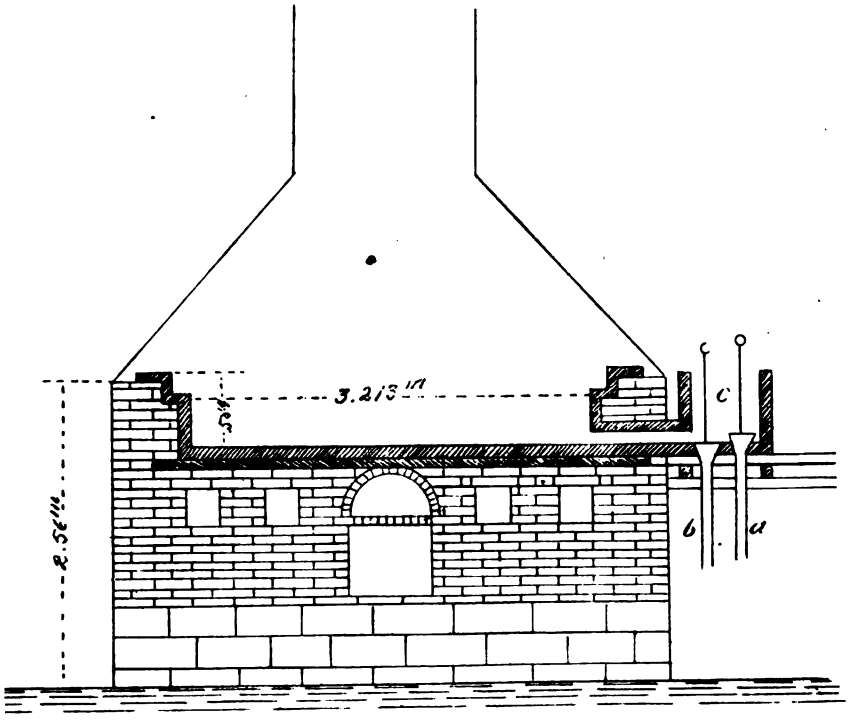
PLAN OF SOLUTION LAUNDER

SCALE

FIG. 3.



SECTION OF SOLUTION LAUNDER

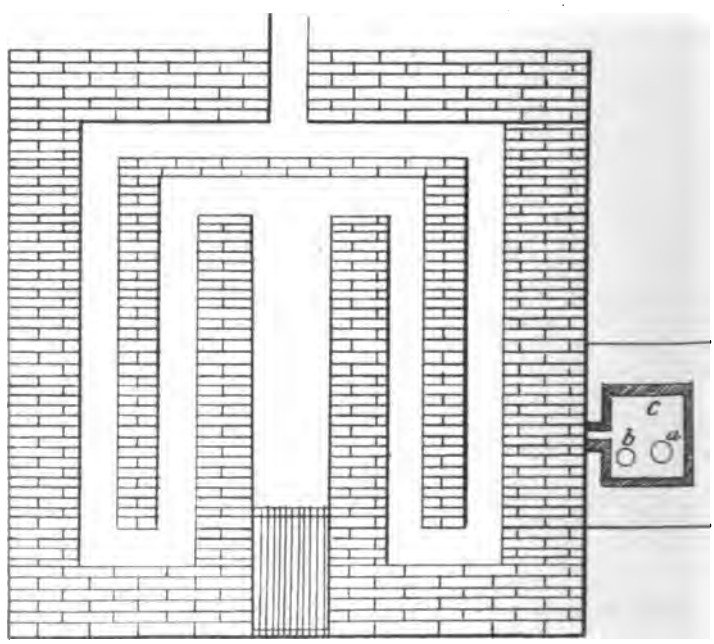


SECTION

Solution Tank for the Copper Crystals with Silver

FIG. 4.

Scale



Plan

4. SOLUTION AND CLASSIFICATION OF THE COPPER SULPHATE CRYSTALS.

As the crystals contain all the insoluble as well as the soluble materials, they must be dissolved and recrystalized in order to separate them. The solution-tanks and crystallization-launders are all situated on the upper story. Between this upper story and the lower ones the boilers for making the steam are placed. Across a passage, about two meters wide and above the boilers, are three tanks 3.20 meters square and 0.60 meter deep (Fig. 4), heated by furnaces for dissolving the fine crystals. The solution is 0.50 meter deep in the vats, and they are covered. The vats are lined with lead and are heated by an arched furnace, the fire of which is made to circulate twice on each side of the fire place by flues which join behind it. The fire-place itself is arched with brick and covered with iron plates. These plates are 0.96 meter by 1.15 meters by 0.015 meter thick. They are the same plates which are used round the works for flooring.

These vats connect at the bottom by a short spout with a launder on the outside, in which there are two pipes, closed with conical stoppers. One of these is on the level with the bottom, and serves to empty the mud collected there. The other, raised a little above it, is used for drawing off the clear mother liquor. This mother liquor from the last crystallization in the tanks below is pumped up into them so as to be about 0.40 meter deep and heated to from 70° to 76° R. It is diluted with water until it is at from 15° to 18° B. Only about half of the mother liquor is used for this purpose. The other half is pumped up to be used in dissolving the granulated copper. The crystals are then added. It is not allowed to concentrate beyond 26° B., as the crystals which are produced from a more concentrated liquor are too small to be easily sold. The fire is drawn when the solution is made. While the solution of the crystals is going on the liquor is kept constantly stirred with wooden rabbles 0.30 meter long by 0.20 meter wide, with a handle 4 meters long. As a very small quantity of silver goes into solution with the copper crystals, it is necessary to precipitate it. This is done with the very fine shot copper which is produced when the copper is granulated for solution, which precipitates all the silver. In order to prevent any loss of heat the tank is covered with a hood and the surface of the liquor protected with boards.

When the solution has taken place, the liquor is left until it settles, which will generally take about twelve hours. During this time it cools down to about 65° R., and falls to 29° B. It must not be allowed to go below this temperature, as there would be danger of small crystals forming. It must therefore be made to cool as slowly as possible, so as to prevent its being too cold when it comes to the crystallization tanks.

When the liquor is quite clear, it is run off by the pipe to the crystallization tanks.

5. TREATMENT OF THE SILVER AND GOLD RESIDUES.

The mud which settles, is composed of some sub-salts and both silver and gold in a fine state of division. This mud, after two or three operations, is washed out through the pipe into two vats below, 1 meter square and 1.50 meters deep.

When enough is collected it is pumped by steam through a filter-press with six filters in each press, and washed with water in the press. The cakes are dried and sent to the silver works. They contain most of the gold, from 2 to 4 per cent. of silver, with some gypsum, and the oxides of lead, arsenic, and antimony.

6. CRYSTALLIZATION OF THE COPPER SULPHATE.

As soon as the liquor has settled it is siphoned off to the crystallization vats on the floor below. There are twelve of these vats to each solution tank. They are all lined with lead. One tank full fills a vat, and one vat is emptied of its crystals each day, so that the liquor remains 12 days in each vat. There are 36 of these vats. They are built two together, and supported on the sides and bottom by braces 0.15 meter square and held by iron-rods at the top. They are 3.75 meters square and 1.05 meters deep.

On the top of each of these vats are 25 poles with five strips of lead, .004 meter thick and 0.02 meter wide, hung on them and reaching to the bottom of the vat. Here the liquor is allowed slowly to crystallize. The largest crystals collect on these strips, the next on the sides of the vat. On the bottom small crystals often collect, which are taken out with a scoop and re-crystallized. When the crystallization is complete the mother liquor is drawn off to be used again in the solution of the copper and of the first copper crystals. The crystals are collected from the strips first, and then from the sides. When taken off they are put down on one corner of the vat until they are all collected. They are washed with water and are dried in a large room which is kept as dark as possible to prevent the decomposition of the crystals. This room is kept heated at 20° R. This is considered essential, as copper sulphate easily loses part of its water, and then becomes opaque. As the only judgment of the quality is by the eye, this makes them look badly, so that they are not easily sold. There are three shelves around the room for drying the crystals, each of which is 2 meters wide. The highest shelf is 2 meters above the ground. The crystals are first carefully sorted. The large ones are sold, the small ones kept for use at the works. They are arranged in doubly inclined rows at right angles to the edge of the shelves, so that they can be easily turned over to dry them. Three categories of crystals are made, two of which are sold. They are arranged mostly as to size. They are packed in barrels which weigh 250 kilograms and kegs which weigh 50.

In the course of the process it is found that every kilogram of granulated copper produces 3.80 kilograms of blue vitriol. It requires for its solution 2.40 kilograms of sulphuric acid at 50° B. Six solution tanks, two boiling vats, and twenty-four crystallization vats can produce from two and a half to three tons of blue vitriol in twenty-four hours. The injectors are all of lead with the points made of hard lead.

To use this process it is necessary that the copper should be nearly free from iron and nickel, as these metals concentrate in the process and would at last injure the quality of the metals unless there is enough of them to make a special treatment for them with the concentrated liquors; that sulphuric acid should be abundant and cheap, and that there should be a ready sale for the copper sulphate crystals. The presence of small quantities of arsenic, antimony, and lead does not interfere with the process, and it is therefore applicable to very impure black coppers, or to those which are very rich in silver and gold.

As the acid mother liquors are constantly used over again there is but little loss of sulphuric acid. Most of what does not go into the copper sulphate is used again. These mother liquors can, except in the cases mentioned, be used indefinitely. The process is simple, requiring but little intelligent labor.

INDEX OF MINES.

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A. B. C. Co	Siskiyou	Cal	160
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Alden	Idaho	Idaho	274
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Aldusen & Co	El Dorado	Cal	96
Alexander	Nye	Nev	361
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Armand	Del Norte	Cal	90
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Atlantic	Lawrence	Dak	253
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Bald Mountain	Placer	Cal	126
Bald Mountain	Sierra	Cal	153
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Bald Mountain Extension.	Sierra	Cal	153
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Baltimore	Alturas	Idaho	264
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Banner	Boise	Idaho	267
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Barker	Meagher	Mont	323
Barlow	Lumpkin	Ga	446
Barnard	Silver Bow	Mont	326
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Bay State	Alturas	Idaho	265
Bay State	Eureka	Nev	353
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Bazouk	Alturas	Idaho	262
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Bennett	Calaveras	Cal	88
Ben O'Connell	Siskiyou	Cal	159
Benson	Salt Lake	Utah	422
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Berling	Beaver Head	Mont	291
Bernard	Placer	Cal	130
Berry	Yavapai	Ariz	61
Berryman	Eureka	Nev	356
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Benaune	Boise	Idaho	267
Beveridge	Inyo	Cal	101
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Big American	Granville	N. C	442
Big Bar	Humboldt	Cal	98
Big Bend Tunnel	Butte	Cal	75
Big Blossom	Boulder	Colo	179
Big Bonanza	Chaffee	Colo	190
Big Casino	Chaffee	Colo	190
Big Casino	Hinsdale	Colo	219
Big Chief	Madison	Mont	316
Big Chief	Lake	Colo	225, 230
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Big Cotton	Gilpin	Colo	211
Big Flat	Del Norte	Cal	90
Big Gun	Placer	Cal	125
Big Hill	Calaveras	Cal	80
Big Horn	Yuma	Ariz	63
Big Horn Gulch	Choteau	Mont	292
Big Indian	Pima	Ariz	42
Big Joe	Siskiyou	Cal	158
Big Money	Elko	Nev	344
Big Nugget	Tuolumne	Cal	172
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Black Bear	Silver Bow	Mont	331
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Black Cloud	Boulder	Colo	182
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Black Hawk	Yavapai	Ariz	62
Black Hawk	Humboldt	Cal	98
Black Hawk	Mono	Cal	113
Black Hawk	Clear Creek	Colo	203
Black Hawk	Dolores	Colo	205
Black Hawk	Alturas	Idaho	261
Black Hawk	Washington	Idaho	284
Black Hawk	Eureka	Nev	356
Black Hawk	Grant	N. Mex	379
Black Hawk	Coos	Oreg	400
Black Horse	Alturas	Idaho	261
Black Iron	Eagle	Colo	208
Black Jack	Owyhee	Idaho	279
Black Jack	Linn	Oreg	399
Black Jack	Kittitass	Wash	435
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Black Rock	Pima	Ariz	44
Black Rock	Yuma	Ariz	62
Black Savage	Alturas	Idaho	261
Blacksmith	White Pine	Nev	369
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Black Warrior	Gallatin	Mont	297
Black Wonder	Hinsdale	Colo	219
Blacky	Sierra	N. Mex	389
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Blanch	Summit	Colo	248
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Blue Gravel	Sierra	Cal	156
Blue Grouse	Custer	Idaho	272
Blue Jacket	Alturas	Idaho	265
Blue Jay	Pima	Ariz	46
Blue Jay	Calaveras	Cal	87
Blue Jay	Boulder	Colo	182
Blue King	Custer	Idaho	274
Blue Rock	El Dorado	Cal	92
Blue King	Pima	Ariz	49
Blue Wing	Silver Bow	Mont	329
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Bobby Burns	El Dorado	Cal	95
Bob Ingersoll	Alturas	Idaho	260
Bob Lewis	Placer	Cal	127, 128
Bob Paul	Calaveras	Cal	84
Bobtail	Gilpin	Colo	211
Bobtail	Lemhi	Idaho	277
Bob Tail	White Pine	Nev	369
Bobtail	Sierra	N. Mex	390
Bobtail	Kittitass	Wash	434
Bode	Calaveras	Cal	88
Bodie Bluff	Mono	Cal	113
Bodie Con	Mono	Cal	112
Bodie Tunnel	Mono	Cal	112, 113
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Bonanza	Sierra	Cal	151
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Bonanza	Tuolumne	Cal	172
Bonanza	Saguache	Colo	238
Bonanza	Juab	Utah	415
Bonanza Grigione	Yavapai	Ariz	58
Bonanza King	San Bernardino.	Cal	142
Bonanza King	Park	Colo	234
Bonanza Tunnel	Gilpin	Colo	212
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Borger	Calaveras	Cal	89
Boss	Summit	Colo	248
Boss Mammoth	Saguache	Colo	239
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Boston	Calaveras	Cal	84
Boston	Mono	Cal	113
Boston	Lawrence	Dak	253
Boston	Oneida	Idaho	278
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Boulder	Summit	Utah	426
Boulder Chief	Jefferson	Mont	303
Boulder Nest	Clear Creek	Colo	192
Bourdaunt	Mariposa	Cal	111
Bowen	Placer	Cal	125
Bowman	Eureka	Nev	356
Boys	Placer	Cal	130
Bracken	Clear Creek	Colo	202
Bradley & Burnham.	Madison	Mont	317
Brackett	Calaveras	Cal	85
Bradburn	Gunnison	Colo	215
Brasher	Alturas	Idaho	265
Breece & Wheeler	Placer	Cal	125
Breece Iron	Lake	Colo	230
Breech Loader	White Pine	Nev	372
Breen	Mariposa	Cal	111
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Brian Boru	Lake	Colo	230
Bright Quartz	Amador	Cal	68
Brilliant	Sierra	N. Mex.	390
British Queen	Churchill	Nev	342
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Brittle Silver	Pima	Ariz	44
Broncho	Inyo	Cal	101
Brooklyn	Ouray	Colo	232
Brooklyn	Juab	Utah	416
Brooklyn	Salt Lake	Utah	416
Brown	Clear Creek	Colo	203
Brown Bear	Trinity	Cal	168
Brown Monster	Inyo	Cal	101
Bruce	Lewis and Clarke.	Mont	309
Brunswick	Shasta	Cal	149
Brush Creek	Sierra	Cal	157
Brushheap	Sierra	N. Mex.	389
Brush Hill	Lassen	Cal	107
Bryan	Calaveras	Cal	84
Bryant	El Dorado	Cal	96
Bryant	Mono	Cal	113
Buchanan	Tuolumne	Cal	173
Buchanan	Idaho	Idaho	275
Buckeye	Boulder	Colo	181
Buckeye	Lake	Colo	230
Buckeye	Jefferson	Mont	302
Buckeye Co	Sierra	Cal	155
Buckhorn	Calaveras	Cal	81
Buckhorn	Fremont	Colo	210
Buckhorn	Alturas	Idaho	263
Buckskin	Custer	Idaho	269
Buena	Boulder	Colo	181
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Buena Vista	Mariposa	Cal	111
Buena Vista	Custer	Idaho	273
Buenos Ayres	Boulder	Colo	181
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Bunker Hill	Del Norte	Cal	90
Bunker Hill	Sierra	Cal	154
Bunker Hill	Alturas	Idaho	260
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Burning Moscow	Beaver	Utah	410
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Burns & Dunlop	Washoe	Nev	368
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Burro	Pitkin	Colo	224
Burro	Grant	N. Mex.	377
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Caledonia	Alturas	Idaho	265
Caledonia	Lawrence	Dak	252
Caledonia	Storey	Nev	367
Caledonia	Sierra	N. Mex.	389
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California	Gilpin	Colo	214
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Camille	Calaveras	Cal	86
Campbell	Calaveras	Cal	88
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Carbonate	Beaver	Utah	408
Carbonate King	Gunnison	Colo	217
Carbonate King	Ouray	Colo	232
Carey	Shoshone	Idaho	281
Cariboo	Utah	Utah	430
Caribou	Boulder	Colo	183
Caribou	San Miguel	Colo	247
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Carlew	Missoula	Mont	325
Carlisle	Grant	N. Mex.	378
Carlisle	Yavapai	Ariz	61
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Carrie	Silver Bow	Mont	337
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Centennial	Siskiyou	Cal	159
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Centennial	Custer	Idaho	270
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Central	Plumas	Cal	131
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Champion	Silver Bow	Mont	337
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Charter Oak	Beaverhead	Mont	289
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Cheeseman	Eagle	Colo	208
Cherokee	Calaveras	Cal	79
Cherokee	Plumas	Cal	130
Cherokee Flat	El Dorado	Cal	92
Chestnut	Dolores	Colo	206
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Chicago	Lake	Colo	228
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Chloride	Pitkin	Colo	235
Chloride Gem	Tooele	Utah	430
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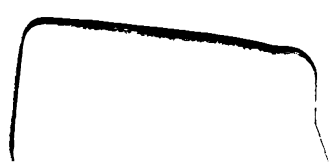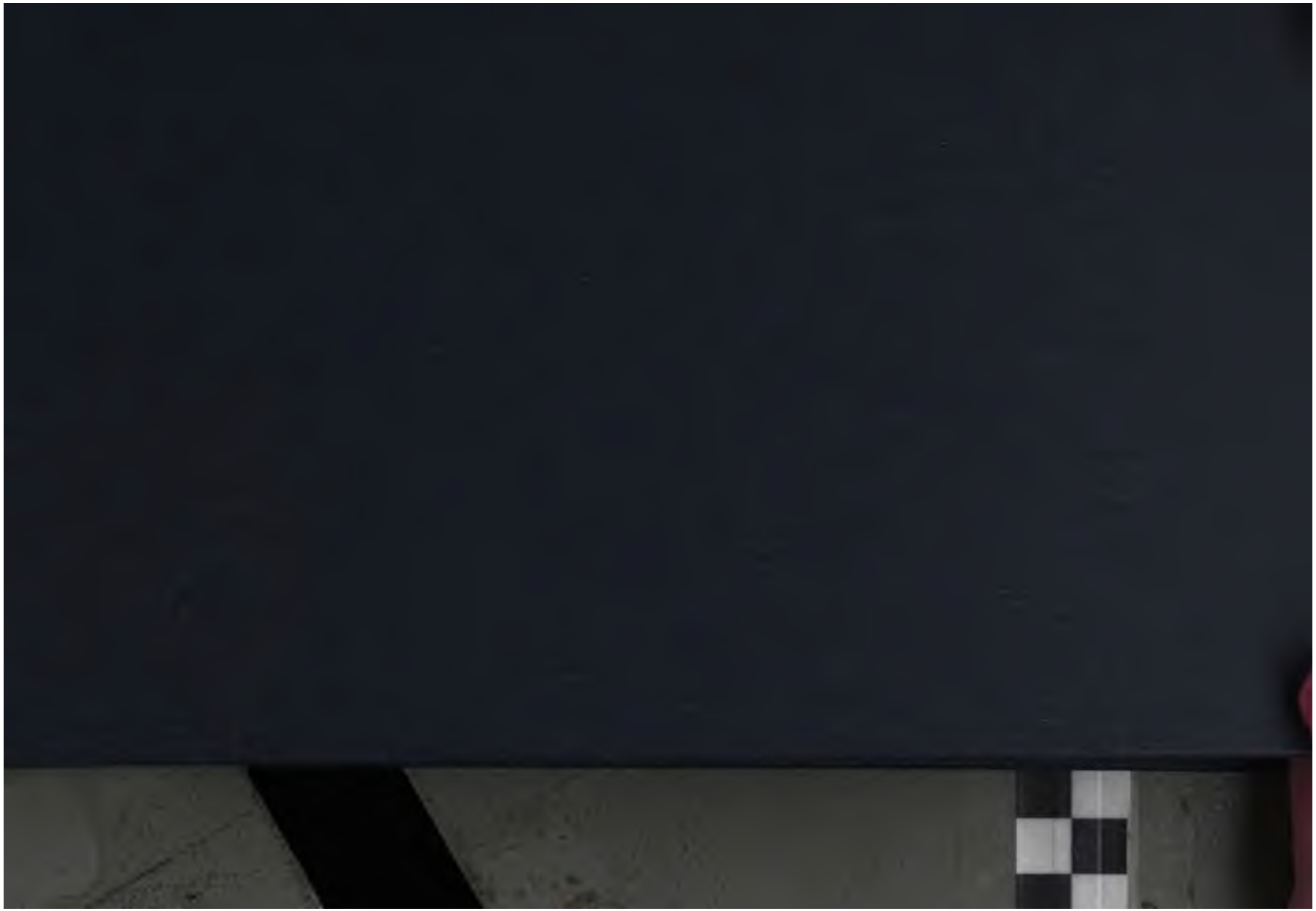
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